Vol. 1085 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

December 1, 1987

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

December 1, 1987 Volume 1085 Number 1

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1085 OG 2
Status of Appeal Cases	1085 OG 2
Notice of Maintenance Fees Payable	1085 OG 3
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1085 OG 3
Reissue Applications Filed	1085 OG 4
Requests for Reexaminations Filed	1085 OG 5
Service by Publication	1085 OG 5
Public Evaluation of PTO Automated Patent Searching	1085 OG 5
Simultaneous Issue of Patents	1085 OG 6
Patent Certificates of Correction	1085 OG 7
Special Boxes for Mail	1085 OG 8
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1085 OG 9
Condition of Patent Applications	1085 OG 10
Statutory Invention Registrations	1
Reissue Patents Granted (32,551)	7
Plant Patents Granted (6,047)	9
Patents Granted	
General and Mechanical (4,709,419)	11
Chemical (4,710,198)	287
Electrical (4,710,588)	403
Design Patents Granted (292,940)	543
Index of Patentees	PI 1
Indices of Reissue, Design, Plant Patentees and Statutory Invention Registrations	PI 59
Classification of	
Patents (Including Reissues)	PI 63
Designs, Plants and Statutory Invention Registration Applications	PI 66
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 67
Designs, Plants and Statutory Invention Registration Applications	PI 69
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

194-256 O.G.-87-1

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without A Hearing as of Oct. 30, 1987.

Chemical Discipline	–	September 29, 1986
Mechanical Discipline	–	November 29, 1985
Electrical Discipline	–	March 28, 1986

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of Oct. 30, 1987.

Chemical	–	July 24, 1985
Electrical	–	January 14, 1985
Mechanical	–	November 21, 1984

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of Oct. 1987.

Affirmed	202
Affirmed-in-Part	44
Reversed	123
Total Decided	369

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on November 27, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,484,359 through 4,485,488
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

. The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 13, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,403,355	06/390,999	9/13/83
4,403,358	06/328,602	9/13/83
4,403,362	06/222,007	9/13/83
4,403,368	06/347,573	9/13/83
4,403,370	06/295,093	9/13/83
4,403,375	06/395,621	9/13/83
4,403,384	06/223,950	9/13/83
4,403,390	06/234,345	9/13/83
4,403,397	06/282,783	9/13/83
4,403,398	06/328,926	9/13/83
4,403,401	06/296,387	9/13/83
4,403,407	06/270,616	9/13/83
4,403,409	06/235,260	9/13/83
4,403,415	06/263,554	9/13/83
4,403,417	06/385,063	9/13/83
4,403,426	06/287,306	9/13/83
4,403,433	06/334,434	9/13/83
4,403,438	06/264,102	9/13/83
4,403,441	06/284,942	9/13/83
4,403,443	06/425,449	9/13/83
4,403,444	06/327,975	9/13/83
4,403,446	06/282,946	9/13/83
4,403,451	06/323,561	9/13/83
4,403,453	06/313,577	9/13/83
4,403,454	06/259,300	9/13/83
4,403,455	06/252,923	9/13/83
4,403,457	06/232,399	9/13/83
4,403,459	06/228,815	9/13/83
4,403,461	06/235,994	9/13/83
4,403,469	06/365,282	9/13/83
4,403,478	06/362,355	9/13/83
4,403,480	06/231,018	9/13/83
4,403,483	06/339,364	9/13/83
4,403,487	06/308,063	9/13/83
4,403,488	06/263,707	9/13/83
4,403,491	06/317,131	9/13/83
4,403,492	06/330,937	9/13/83
4,403,499	06/319,253	9/13/83
4,403,503	06/319,260	9/13/83
4,403,506	06/310,933	9/13/83
4,403,507	06/297,639	9/13/83
4,403,509	06/275,874	9/13/83
4,403,521	06/277,457	9/13/83
4,403,532	06/305,126	9/13/83
4,403,543	06/374,354	9/13/83
4,403,545	06/337,581	9/13/83
4,403,548	06/295,572	9/13/83
4,403,550	06/291,182	9/13/83
4,403,552	06/328,932	9/13/83
4,403,554	06/259,276	9/13/83
4,403,556	06/269,409	9/13/83
4,403,564	06/239,382	9/13/83
4,403,569	06/335,372	9/13/83
4,403,570	06/338,469	9/13/83
4,403,571	06/328,893	9/13/83
4,403,573	06/363,338	9/13/83

Patent Number	Serial Number	Issue Date
4,403,574	06/272,673	9/13/83
4,403,575	06/293,884	9/13/83
4,403,577	06/217,993	9/13/83
4,403,580	06/218,427	9/13/83
4,403,595	06/269,698	9/13/83
4,403,600	06/327,955	9/13/83
4,403,602	06/355,917	9/13/83
4,403,604	06/378,004	9/13/83
4,403,615	06/330,568	9/13/83
4,403,616	06/271,984	9/13/83
4,403,638	06/370,304	9/13/83
4,403,640	06/282,728	9/13/83
4,403,641	06/296,430	9/13/83
4,403,643	06/276,431	9/13/83
4,403,644	06/419,728	9/13/83
4,403,646	06/415,588	9/13/83
4,403,669	06/340,275	9/13/83
4,403,672	06/269,783	9/13/83
4,403,674	06/321,068	9/13/83
4,403,675	06/416,506	9/13/83
4,403,697	06/220,828	9/13/83
4,403,701	06/249,080	9/13/83
4,403,703	06/231,901	9/13/83
4,403,714	06/329,305	9/13/83
4,403,716	06/382,129	9/13/83
4,403,724	06/252,414	9/13/83
4,403,725	06/241,009	9/13/83
4,403,730	06/270,889	9/13/83
4,403,731	06/357,648	9/13/83
4,403,734	06/227,521	9/13/83
4,403,740	06/261,062	9/13/83
4,403,743	06/270,124	9/13/83
4,403,747	06/233,920	9/13/83
4,403,760	06/272,657	9/13/83
4,403,763	06/293,584	9/13/83
4,403,764	06/309,711	9/13/83
4,403,765	06/264,365	9/13/83
4,403,767	06/220,453	9/13/83
4,403,771	06/258,798	9/13/83
4,403,774	06/277,861	9/13/83
4,403,776	06/257,920	9/13/83
4,403,782	06/229,694	9/13/83
4,403,784	06/227,418	9/13/83
4,403,790	06/230,232	9/13/83
4,403,797	06/355,980	9/13/83
4,403,798	06/273,998	9/13/83
4,403,811	06/220,700	9/13/83
4,403,815	06/224,305	9/13/83
4,403,851	06/293,539	9/13/83
4,403,856	06/413,977	9/13/83
4,403,864	06/369,149	9/13/83
4,403,876	06/304,527	9/13/83
4,403,879	06/261,324	9/13/83
4,403,880	06/243,624	9/13/83
4,403,881	06/283,879	9/13/83
4,403,883	06/301,182	9/13/83
4,403,903	06/303,727	9/13/83
4,403,914	06/282,524	9/13/83
4,403,919	06/306,953	9/13/83
4,403,923	06/262,925	9/13/83
4,403,929	06/229,852	9/13/83
4,403,940	06/315,843	9/13/83
4,403,948	06/243,335	9/13/83
4,403,957	06/375,766	9/13/83
4,403,961	06/339,004	9/13/83
4,403,962	06/329,762	9/13/83
4,403,966	06/252,671	9/13/83
4,403,967	06/304,262	9/13/83
4,403,979	06/268,426	9/13/83
4,403,992	06/307,386	9/13/83
4,404,019	06/328,719	9/13/83
4,404,021	06/399,550	9/13/83
4,404,027	06/350,439	9/13/83
4,404,028	06/257,778	9/13/83
4,404,038	06/319,909	9/13/83
4,404,045	06/261,940	9/13/83
4,404,055	06/259,761	9/13/83
4,404,058	06/366,974	9/13/83
4,404,061	06/293,752	9/13/83
4,404,069	06/358,771	9/13/83
4,404,077	06/355,853	9/13/83
4,404,078	06/349,764	9/13/83
4,404,094	06/394,718	9/13/83
4,404,100	06/374,973	9/13/83
4,404,101	06/376,103	9/13/83
4,404,104	06/301,154	9/13/83
4,404,113	06/301,735	9/13/83
4,404,135	06/405,975	9/13/83
4,404,152	06/431,484	9/13/83
4,404,156	06/289,117	9/13/83
4,404,165	06/253,806	9/13/83
4,404,184	06/458,892	9/13/83
4,404,190	06/341,437	9/13/83
4,404,191	06/322,557	9/13/83
4,404,208	06/393,803	9/13/83
4,404,209	06/393,804	9/13/83
4,404,228	06/341,184	9/13/83
4,404,243	06/404,766	9/13/83
4,404,244	06/437,092	9/13/83
4,404,250	06/422,041	9/13/83
4,404,267	06/371,879	9/13/83
4,404,286	06/351,073	9/13/83
4,404,298	06/337,020	9/13/83
4,404,305	06/349,214	9/13/83
4,404,307	06/396,257	9/13/83
4,404,313	06/297,549	9/13/83
4,404,320	06/292,187	9/13/83
4,404,360	06/317,119	9/13/83
4,404,368	06/234,788	9/13/83
4,404,370	06/323,576	9/13/83
4,404,371	06/334,590	9/13/83
4,404,382	06/362,447	9/13/83
4,404,386	06/272,865	9/13/83
4,404,387	06/362,446	9/13/83
4,404,391	06/249,983	9/13/83
4,404,396	06/338,492	9/13/83
4,404,397	06/221,130	9/13/83
4,404,399	06/431,532	9/13/83
4,404,432	06/299,482	9/13/83
4,404,433	06/253,107	9/13/83
4,404,435	06/328,379	9/13/83
4,404,450	06/338,391	9/13/83
4,404,453	06/300,991	9/13/83
4,404,465	06/292,016	9/13/83
4,404,472	06/334,845	9/13/83
4,404,515	06/278,451	9/13/83
4,404,526	06/230,397	9/13/83
4,404,533	06/362,997	9/13/83
4,404,543	06/289,480	9/13/83
4,404,550	06/251,931	9/13/83
4,404,564	06/346,766	9/13/83
4,404,585	06/309,721	9/13/83
4,404,604	06/254,326	9/13/83
4,404,606	06/259,624	9/13/83
4,404,607	06/265,076	9/13/83
4,404,619	06/349,827	9/13/83
4,404,622	06/355,844	9/13/83
4,404,629	06/228,441	9/13/83
4,404,634	06/257,921	9/13/83
4,404,669	06/341,144	9/13/83
4,404,674	06/282,319	9/13/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,538,872, Re. S.N. 053,657, Filed May 26, 1987, Cl. 339/97P. ELECTRICAL CONTACT FOR TERMINATING INSULATED CONDUCTORS, Weldon L. Brubaker, et al., Owner of Record: *Molex, Inc., Lisle, Ill.,* Attorney or Agent: Louis A. Hecht, Ex. Gp.: 322

4,546,048, Re. S.N. 047,238, Filed May 7, 1987, Cl. 428/460, COMPOSITE THERMAL SHIELD FOR ENGINE COMPONENTS, William D. Guenther, Owner of Record: *Dana Corp., Toledo, Ohio,* Attorney or Agent: Frank B. McDonald, Ex. Gp.: 154

4,548,375, Re. S.N. 102,400, Filed Sept. 29, 1987, Cl. 248/205.2, HOLDER FOR ALL ITEMS AND THE LIKE, Ernest Moss, Owner of Record: *Inventor,* Attorney or Agent: Edwin D. Schindler, Ex. Gp.: 355

4,548,449, Re. S.N. 110,375, Filed Oct. 20, 1987, Cl. 439/641, LAMP SOCKET ATTACHMENT, John A. Corsetti, Owner of Record: *Dennis L. Johnson, Jensen Beach, Fla.,* Attorney or Agent: John A. Clifford, et al., Ex. Gp.: 322

4,574,975, Re. S.N. 105,122, Filed Oct. 6, 1987, Cl. 220/306, RESEALABLE CONTAINER CLOSURE, Robert L. Taylor, et al., Owner of Record: *Reynolds Metals Co., Richmond, Va.,* Attorney or Agent: Robert C. Lyne, Jr., et al., Ex. Gp.: 241

4,577,956, Re. S.N. 043,400, Filed Apr. 28, 1987, Cl. 355/40, PROCESS FOR THE CHAOTIC FILMING OF DOCUMENTS AND DEVICE FOR THE COMPLETION THEREOF, Rolf Klosterhuber, et al., Owner of Record: *Inventor,* Attorney or Agent: John H. Mion, et al., Ex. Gp.: 211

4,583,978, Re. S.N. 108,768, Filed Oct. 15, 1987, Cl. 604/208, SYRINGE, Michael Porat, et al., Owner of Record: *Inventor,* Attorney or Agent: Donald L. Dennison, et al., Ex. Gp.: 336

4,608,344, Re. S.N. 107,763, Filed Oct. 9, 1987, Cl. 436/34, METHOD FOR THE DETERMINATION OF SPECIES IN SOLUTION WITH AN OPTICAL WAVE-GUIDE, Timothy J. N. Carter, et al., Owner of Record: *Battelle Memorial Institute, Geneva, Switzerland,* Attorney or Agent: Herbert Dubno, et al., Ex. Gp.: 134

4,617,419, Re. S.N. 108,436, Filed Oct. 14, 1987, Cl. 568/464, PROCESS FOR PREPARING NATURAL BENZALDEHYDE AND ACETALDEHYDE NATURAL BENZALDEHYDE AND ACETALDEHYPE COMPOSITIONS PRODUCTS PRODUCED THEREBY AND ORGANOLEPTIC UTILITIES THEREFOR, Charles Wiener, et al., Owner of Record: *Interntaional Flavors and Fragrances, Inc., New York, N.Y.,* Attorney or Agent: Harold Haidt, et al., Ex. Gp.: 126

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,942,680, Reexam. No. 90/001,362, Requested: Oct. 28, 1987, Cl. 220/324, SPRAY PAINT CONTAINER AND ATTACHMENT THEREFOR, Larry E. & Edward H. Seeley, Owner of Record: *Inventors, Binghamton, N.Y. & Great Bend, Pa.,* Attorney or Agent: Unknown, Ex. Gp.: 240, Requester: Owners

4,433,446, Reexam. No. 90/001,364, Requested: Oct. 30, 1987, Cl. 4/378, FLUSH VALVE ATTACHMENT SYSTEM, Ronald N. Grimstad, Owner of Record: *Kohler Co., Kohler, Wis.,* Attorney or Agent: Quarles & Brady, Ex. Gp.: 240, Requester: Owner

4,480,214, Reexam. No. 90/001,359, Requested: Oct. 26, 1987, Cl. 315/290, STARTER FOR GASEOUS DISCHARGE LAMP, Gregory L. Sodini, Owner of Record: *FL Industries, Livingston, N.J.,* Attorney or Agent: Carella, Byrne, et al., Ex. Gp.: 260, Requester: Owner

4,602,648, Reexam. No. 90/001,360, Requested: Oct. 28, 1987, Cl. 132/007, PRE-SHAMPOO NORMALIZER FOR A HAIR STRAIGHTENING SYSTEM, Ali N. Syed, et al., Owner of Record: *Soft Sheen Products, Inc., Chicago, Ill.,* Attorney or Agent: Allegretti, Newitt, et al., Ex. Gp.: 330, Requester: Owner

4,654,007, Reexam. No. 90/001,361, Requested: Oct. 26, 1987, Cl. 433/236, PORCELAIN DENTAL RESTORATION METHOD, Roger M. Sigler, et al., Owner of Record: *Myron International, Inc., Kansas City, Kans.* Attorney or Agent: John M. Collins, Ex. Gp.: 330, Requester: Owner

4,680,836, Reexam. No. 90/001,363, Requested: Oct. 30, 1987, Cl. 24/150 OFP, ONE-PIECE PLASTIC FASTENER, David R. Wisecup, Owner of Record: *Monarch Marking Systems, Inc., Dayton, Ohio,* Attorney or Agent: Joseph J. Grass, Ex. Gp.: 350, Requester: Dennison Mftg. Co., Framingham, Mass.

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Executive One, Inc., Seal Beach, Calif., Reg. No. 1,255,173, for the mark "SCREEN-PAINTER", Canc. No. 15,881.

ERMA S. BROWN,
Administrator
of the Trademark Trial
and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner
for Trademarks.

Public Evaluation of PTO Automated Patent Searching

The PTO plans to conduct a limited public evaluation of its Automated Patent System (APS) text and image searching capabilities from Jan. 1988 to June 1988. The Office will make available to selected participants, access to APS search system capabilities in its facilities at Arlington, Va. Participants will be selected by the PTO based upon frequency of use of the PTO's patent Public Search Room; variety of searches performed (e.g., pre-application, validity, infringement, state-of-the-art, and applied technology); familiarity and expertise in using commercial automated text search systems; ability to take a 12 to 16 hour training course in APS search techniques, willingness to complete data collelction forms and participate in debriefing interviews; and willingness to use APS search capabilities in the course of their day-to-day work.

Persons who wish to be considered for participation in the evaluation should complete a Nomination Form,

available from the Manager of the patent Public Search Room, or from the address given below. Completed Nomination Forms should be sent to the following address, and must be received within two calendar weeks of the date of this publication, or by Dec. 11, 1987, whichever is the later date. Participants will be notified of their selection by Jan. 1, 1988, if possible. APS training classes are scheduled to begin on Jan. 4, 1988 and Jan. 11, 1988. Approximately 20 participants will attend each training class.

Request for additional information and/or Nomination Forms should be directed to:

L. Liddle
Office of the Administrator for Automation
U.S. Patent and Trademark Office
Crystal Park 2, Suite 1002
Washington, D.C. 20231

Simultaneous Issue of Patents

Applicants and their attorneys who desire the simultaneous issue of allowed applications must submit the request to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231
Attention: Office of Publications
CP2–6C07

The request must contain the following information about each allowed application for which simultaneous issue is requested:

(1) serial number
(2) filing date
(3) name(s) of inventor(s)
(4) title of invention
(5) date of allowance
(6) batch number

Separate copies of the request must accompany each Issue Fee Transmittal (PTO–85b).

Questions concerning this practice may be directed to Mr. Stanley J. Bania, Director, Office of Publications, Area Code (703) 557–3794.

This notice supersedes the notice published on Aug. 25, 1978, at 974 O.G. 16.

Nov. 9, 1987.

THERESA A. BRELSFORD,
Assistant Commissioner
for Administration.

PATENT NOTICES

Certificates of Correction for the Week of Dec. 1, 1987

Re. 31,144	4,642,567	4,668,987	4,680,440
Re. 32,447	4,642,632	4,669,211	4,680,943
D. 291,125	4,642,721	4,669,512	4,681,052
4,266,985	4,643,058	4,670,039	4,681,101
4,351,396	4,644,032	4,670,125	4,681,322
4,361,060	4,646,030	4,670,293	4,681,351
4,459,677	4,647,437	4,670,802	4,681,424
4,486,750	4,649,160	4,670,879	4,681,582
4,513,272	4,650,547	4,670,984	4,681,698
4,526,988	4,652,168	4,671,370	4,681,902
4,539,393	4,652,454	4,672,533	4,682,037
4,551,239	4,653,328	4,673,758	4,682,186
4,575,029	4,654,422	4,674,226	4,682,247
4,583,391	4,655,193	4,674,280	4,682,668
4,594,529	4,656,207	4,674,331	4,682,897
4,596,567	4,656,467	4,674,373	4,682,933
4,601,234	4,657,649	4,674,509	4,683,050
4,604,382	4,657,744	4,674,789	4,683,219
4,605,602	4,657,915	4,674,991	4,683,496
4,606,726	4,658,373	4,675,133	4,683,524
4,612,880	4,659,135	4,675,176	4,683,550
4,616,594	4,659,373	4,675,491	4,684,035
4,622,427	4,659,380	4,675,532	4,684,080
4,623,531	4,659,561	4,675,595	4,684,123
4,624,255	4,660,032	4,675,946	4,684,155
4,627,268	4,660,322	4,676,049	4,684,392
4,629,090	4,661,323	4,676,101	4,684,457
4,629,610	4,661,640	4,676,794	4,684,458
4,629,739	4,664,557	4,676,899	4,684,789
4,630,941	4,664,676	4,677,109	4,685,256
4,631,063	4,664,997	4,677,291	4,685,355
4,631,362	4,665,055	4,677,387	4,685,733
4,633,912	4,665,699	4,677,445	4,685,755
4,634,276	4,665,937	4,678,014	4,685,856
4,634,277	4,665,983	4,679,492	4,686,065
4,637,403	4,666,636	4,679,644	4,686,170
4,639,256	4,667,798	4,679,771	4,686,658
4,639,518	4,668,342	4,679,784	4,687,088
4,641,865	4,668,382	4,680,034	4,687,505
4,642,545	4,668,947	4,680,330	4,687,879

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box_____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks (e.g. amendments to applications and request for extensions of time to file an opposition). Mail directed to the Trademark Trial and Appeal Board should have "Attention TTAB" on the envelope in addition to "Box 5".
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and any subsequently filed papers for those applications.
Box 8	All papers for the Office of the Solicitor.
Box 9	Coupon orders for the U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box AF	Amendments or responses to final rejections in patent applications, submitted under the expedited processing program.
Box FWC	Mail related to File Wrapper and Continuations.
Box Interference	Communications relating to interferences and applications and patents involved in interferences.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to reexamination application

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Irvine: University of California, Irvine Library	(714) 856-7234
	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1741
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4222
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: Free Library	(215) 686-5330
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF October 24, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	9-11-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-27-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-29-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	10-14-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-05-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	5-24-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	9-06-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	5-02-86
DESIGN, GROUP 290—K. L. CAGE, Director	1-18-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	9-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	2-06-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-02-87

Expiration of patents: The patents within the range of numbers indicated below expire during October 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,531,806 to 3,537,106, inclusive

Plant Patents ..... Numbers 2,991 to 2,995 inclusive

STATUTORY INVENTION REGISTRATIONS

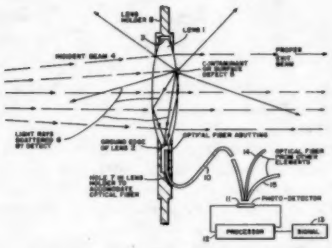
PUBLISHED DECEMBER 1, 1987

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H376
DEGRADATION MONITOR FOR LASER OPTICS

James C. Bremer, Gaithersburg, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 7, 1985, Ser. No. 784,902
Int. Cl.[4] G01N *21/32*
U.S. Cl. 356—239 **6 Claims**

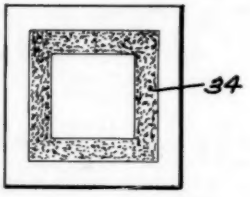


1. A system for detecting degradation of an optical element comprising an optical detector for detecting optical emission in an area of said optical element where optical emissions are normally not present except under conditions of degradation of the optical element, and first coupling means coupling optical emissions from said area to said optical detector.

H377
RELEASEABLE ADHESIVE PADS

Walter G. Greig, Lewiston, N.Y., assignor to Moore Business Forms, Inc., Glenview, Ill.

Filed May 13, 1986, Ser. No. 862,825
Int. Cl.[4] B42D *1/00*
U.S. Cl. 281—2 **6 Claims**



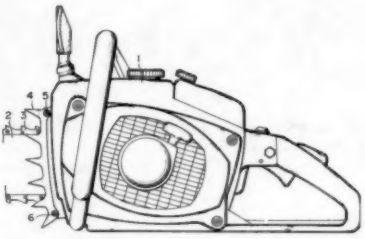
1. A pad comprising:

a plurality of sheets adhered to one another by releasable adhesive, each of the plurality of sheets having the adhesive placed in more than one striplike position distributed over an underside of each sheet but which adhesive nevertheless leaves at least a portion of at least one edge of each sheet free of adhesive to facilitate removal of each sheet from the pad.

H378
SPIKED BUMPER

Isao Matsumoto, Koganei, Japan, assignor to Kioritz Corporation, Mitaka, Japan

Continuation of Ser. No. 662,499, Oct. 18, 1984, abandoned.
This application Jul. 18, 1986, Ser. No. 888,105
Claims priority, application Japan, Nov. 7, 1983, 58-172150[U]
Int. Cl.[4] B23D *57/02*
U.S. Cl. 30—382 **5 Claims**



1. An elongated spiked-bumper mounted to a forward end portion of a main body of a chain saw in a position adjacent and transverse to a guide bar for guiding a saw chain in its movement around an outer periphery of the guide bar, comprising:

a mounting reference hole formed at one longitudinal end portion of the spiked-bumper for securing the spiked-bumper to the forward end portion of the main body of the chain saw beyond one edge of the guide bar; and

at least one mounting adjusting hole formed at a lower longitudinal opposite end portion of the spiked-bumper, positioned beyond the other edge of the guide bar, said at least one mounting adjusting hole effectively extending on a short arc constituting a part of an imaginary circle which is centered at the center of the mounting reference hole for adjusting the position in which the spiked-bumper is secured to the forward end portion of the main body of the chain saw;

wherein said spiked-bumper is rotably adjustable to move said lower longitudinal opposite end portion forward for sawing smaller trees.

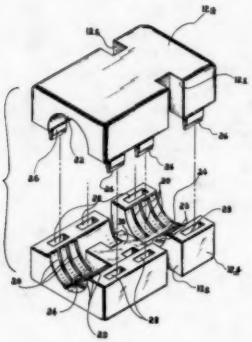
H379
STRAIN RELIEF AND GROUND CONNECTOR FOR SHIELDED CABLE

Harry B. Alexander, Jr., Harrisburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 24, 1986, Ser. No. 911,224
Int. Cl.[4] H01R *13/648*
U.S. Cl. 439—610 **1 Claim**

1. A strain relief connector for establishing an electrical connection between a grounded chassis and a location on an insulated cable having a flexible conductive shield beneath an outer layer of insulation said insulation being removed at said location said connector comprising: an electrical conductive contact engaging said shield and having a deflectible finger extending therefrom; upper and lower housing of electrical insulating material, having longitudinal and spaced radial clamping ribs with sharp edges and a raised platform in said lower housing for engaging said contact, said housings being ultrasonically bonded to each other at said location in a closed position and forming an exterior channel on opposite sides into

which said contact finger extends and a notch in said chassis for receiving the channel and positioning the upper and lower housings with respect to the chassis, the sharp edges of the ribs projecting into the insulation to secure the housings to the



cable and the platform pressing against the contact holding it against the flexible conductive shield to form an electrical contact, said finger being in contact with said chassis within said notch.

H380

TRIMMER

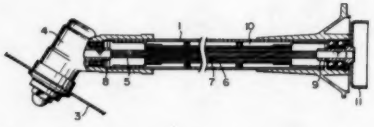
Yoetsu Yokocho, Ome, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Continuation of Ser. No. 733,482, May 13, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,594

Claims priority, application Japan, May 25, 1984, 59-75930[U]

Int. Cl.⁴ B26B *7/00*

U.S. Cl. 30—276 **3 Claims**



1. A trimmer comprising:

a hollow straight operation rod;

a prime mover supported at an upper end of said hollow operation rod;

a gear chamber supported at a lower end of said hollow operation rod to drive a cutter blade when a cutting operation is performed;

a flexible shaft extending through the interior of said hollow rod along substantially the full length thereof for transmitting driving power from said prime mover to said gear chamber;

a straight liner fitted along substantially the full length of said flexible shaft over an outer peripheral surface of said flexible shaft, said liner being spaced apart from an inner peripheral surface of said hollow operation rod by a suitable clearance along substantially the full length thereof and fixed to the hollow operation rod at both ends thereof.

H381

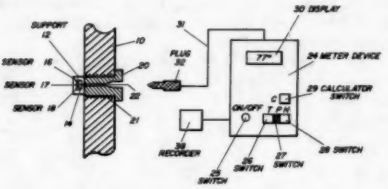
CONDITION MONITORING DEVICE

Stanley G. Pounds, Budd Lake, and Daniel Ramer, Kinnelon, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 16, 1986, Ser. No. 942,555

Int. Cl.⁴ G01K *1/14, 13/00;* **G01L** *5/14*

U.S. Cl. 374—142 **11 Claims**



1. A multiple sensor condition monitoring device, for use with an enclosed container, comprising:

a sealed container;

a plurality of passive sensors positioned within said sensor and adapted to measure temperature, pressure, and relative humidity within said container;

means for inductive transmission for the activation and response of the measurement sensors;

meter means connected to said sensor for operating said sensors and receiving measurements therefrom; and

means for enabling the calculation of specific quantities of moisture in said container using the measurements from said sensor.

H382

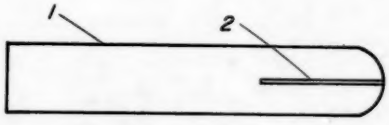
LONG ROD PENETRATOR

William P. Keown, West Milford, N.J., and Peter N. Jones, Seven Oaks, England, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 2, 1987, Ser. No. 24,098

Int. Cl.⁴ F42B *11/14*

U.S. Cl. 102—517 **5 Claims**



1. A penetrator for a kinetic energy projectile comprising a penetrator rod, having embedded therein, as a central core rod within said penetrator rod, a lubricator rod for providing lubrication to the penetrator as it impacts and penetrates a target.

H383

LAMINATED MAGNET FIELD COIL SHEATH

John R. Skaritka, Coram, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 15, 1987, Ser. No. 49,909

Int. Cl.⁴ H01L *39/24*

U.S. Cl. 29—599 **5 Claims**

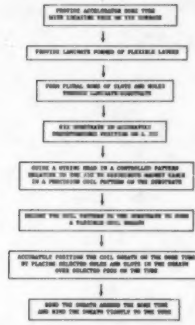
1. A method of making a superconductor magnet trim coil assembly mounted on a bore tube for use in a superconductor supercollider particle accelerator, comprising the steps of;

providing a particle accelerator bore tube having a generally cylindrically outer surface for supporting thereon selected patterns of coiled superconductor magnet cable,

providing a laminated substrate formed of a layer of B-grade epoxy resin, a layer of fiberglass cloth and a layer of insulating resin tape, all of which are compatible with a cryogenic environment,

forming a plurality of rows of generally circular holes through said substrate, at locations precisely predetermined thereon, and forming a plurality of rows of generally rectangular slots through said substrate, at locations precisely determined thereon,

positioning precisely a predetermined number of coils of insulated superconductor cable in a selected pattern on the substrate with a substantially uniform spacing being maintained between adjacent turns of the coils, and with a precisely predetermined reference relationship being established between each coil and said holes and slots,



pressing a layer of resin insulating tape over the coil pattern to secure the respective turns of the coils in the pattern in position relative to one another and to the substrate,

positioning precisely a number of locating pegs at selected points on the surface of the bore tube and fastening said pegs to the bore tube surface at said points, respectively,

placing the substrate on said bore tube, with the respective locating pegs being positioned through predetermined holes or slots in the substrate, thereby to precisely position the substrate and coil pattern relative to the pegs and to the bore tube,

wrapping a layer of resin insulating tape around the substrate and the bore tube, and heating the resin tape and bore tube sufficiently to bond the substrate to the tape and aid in securing the predetermined alignment of the turns of the coil pattern with respect to the bore tube.

H384
STOWABLE THREE-AXIS REACTION-STEERING SYSTEM

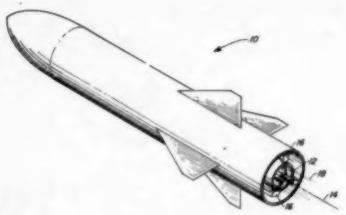
Robert B. Dillinger, and Arnold O. Danielson, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 28, 1987, Ser. No. 55,810
Int. Cl.[4] F02K *1/00*
U.S. Cl. 60—230 **4 Claims**

1. A thrust vector control apparatus for a rocket motor having an exhaust nozzle discharging an exhaust stream, said exhaust nozzle having a longitudinal axis, the apparatus comprising:

a vane;

means for mounting said vane on said exhaust nozzle for pivotal movement between a retracted position without said exhaust stream and an inserted position within said exhaust stream and for rotational movement about a rotational axis generally perpendicular to said longitudinal axis;



means for pivoting said vane between said retracted position and said inserted position; and

means for rotating said vane about said rotational axis.

H385
SHALE COAGULATING LOW SOLIDS DRILLING FLUID

Gerard M. Bol, GD Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 22, 1985, Ser. No. 757,236
Claims priority, application United Kingdom, Sep. 11, 1984, 8422912
Int. Cl.[4] C09K *7/02*
U.S. Cl. 252—8.51 **6 Claims**

1. An aqueous drilling fluid for use in an environment in which fines are suspended therein, the drilling fluid comprising:

at least one polymeric component effective to increase the viscosity of the drilling fluid;

at least one polymeric component effective to reduce fluid loss from the drilling fluid; and

at least one organic polycationic polymeric component having a molecular weight in the range from 500,000 to 15,000,000 which is effective to from discrete aggregates of the fines in the drilling fluid.

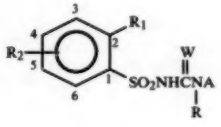
H386
HERBICIDAL SULFONAMIDES

George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 27, 1985, Ser. No. 769,686
Int. Cl.[4] A01N *43/54*; C07D *239/80, 491/048, 491/052*
U.S. Cl. 71—92 **24 Claims**

1. A compound of the formula

I

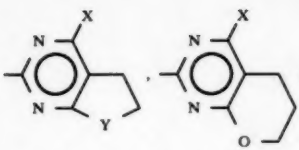


wherein

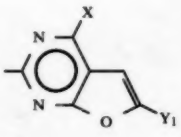
W is O or S;

R is H or CH_3;

A is



A-1 A-2



A-3

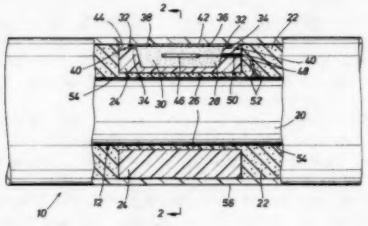
X is H, CH_3, C_2H_5, OCH_3, OC_2H_5, Cl, OCF_2H, SCH_3 or $N(CH_3)_2$;
Y is O or CH_2;
Y_1 is H, CH_3 or C_2H_5;
R_1 is QR_3, $-C{\equiv}CR_4$, N_3, $P(W_1)R_5R_6$, $-CR_7R_8R_9$ or C_2–C_4 alkenyl substituted with CN, OH, NO_2 or $S(O)_nR_{10}$;
R_2 is H, F, Cl, Br, CF_3, CN, NO_2, C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkylthio, C_1–C_2 haloalkyl, C_1–C_2 haloalkoxy, C_1–C_2 haloalkylthio, C_1–C_2 alkylsulfinyl, C_1–C_2 alkylsulfonyl, CH_2OCH_3, CH_2SCH_3, C_3 alkenyloxy or C_3 alkynyloxy;
Q is O, S, SO or SO_2;
R_3 is C_1–C_4 alkyl substituted with C_1–C_2 alkoxy, C_1–C_2 alkylthio, C_1–C_2 alkylsulfinyl, C_1–C_2 alkylsulfonyl, C_1–C_2 haloalkoxy, C_1–C_2 haloalkylthio, C_1–C_2 haloalkylsulfinyl, C_1–C_2 haloalkylsulfonyl, OH, CN, NH_2, C_1–C_2 alkylamino, di(C_1–C_2)alkylamino or phenyl; or R_3 is C_2–C_4 alkenyl [optionally] substituted with the substituents mentioned above; or R_3 is C_2–C_4 alkynyl;
R_4 is H or C_1–C_2 alkyl optionally substituted with halogen, OH, C_1–C_2 alkoxy, C_1–C_2 alkylthio, C_1–C_2 haloalkoxy, CN, C_2–C_3 alkoxycarbonyl, cyclopropyl or phenyl; or R_4 is C_3–C_6 cycloalkyl or phenyl;
W_1 is O or S;
R_5 and R_6 are independently C_1–C_2 alkyl, C_1–C_2 alkoxy or C_1–C_2 alkylthio;
R_7 is H, CH_3 or halogen;
R_8 is H or CH_3;
R_9 is $C(O)R_{11}$ or C_1–C_2 alkyl substituted with one or more groups selected from $C(O)R_{11}$, CN, NO_2, C_1–C_2 haloalkoxy or C_1–C_2 haloalkylthio;
R_{10} is C_1–C_2 alkyl;
R_{11} is H or C_1–C_2 alkyl; and
n is 0, 1 or 2;
and their agriculturally suitable salts; provided that when R_3 is substituted with OH or NH_2, said substituents must be separated from Q by at least two carbon atoms.

H387
WAVELENGTH FILTER FOR MARINE SEISMIC CABLES

Vitold R. Kruka, and Edward R. Cadena, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 22, 1981, Ser. No. 333,524
Int. Cl.⁴ H04R *1/22*; G01V *1/16*
U.S. Cl. 367—154 **14 Claims**

1. A marine seismic cable comprising: a core; a housing coupled to said core and having a cavity adapted for holding a hydrophone, said cavity being located on a first side of said housing; elastic material positioned in said cavity and extending beyond the boundary of said cavity; a hydrophone positioned in said elastic material in said cavity; and a wavelength filter positioned adjacent said elastic material to attenuate flow

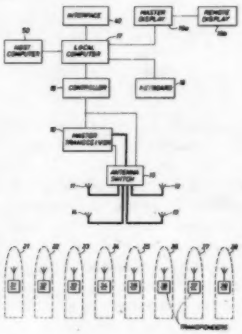


noise signals having shortwave lengths relative to the wavelengths of seismic signals.

H388
APPARATUS AND METHOD FOR LOCATING TOWED SEISMIC FLOATS

Joseph P. Lloyd, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 31, 1984, Ser. No. 687,630
Int. Cl.⁴ G01V *1/38*; G01S *3/80*
U.S. Cl. 367—19 **5 Claims**



1. A method of locating a towed object relative to a towing vessel, comprising:
independently determining a plurality of individual ranges from corresponding known preselected locations on said vessel to said towed object; and
determining the point of intersection of said plurality of ranges.

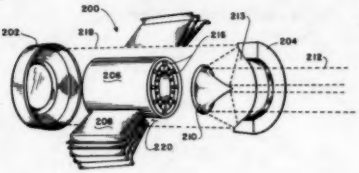
H389
FLUID REFRACTION OPTICAL PATH PHASE CORRECTION

Lamar F. Moon, Agoura, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 6, 1986, Ser. No. 816,610
Int. Cl.⁴ H01S *3/22*, *3/095*
U.S. Cl. 372—58 **43 Claims**

1. A method for correcting phase aberrations across the spatial distribution of a stimulated emission optical energy beam comprising the steps of:
transmitting said energy beam through a flow of mixed high optical refraction first gas and lower optical refraction second gas, having spatially distributed regions of differing thickness each proportional to the amount of phase correction needed at the corresponding spatial regions of a cross-section of said energy beam; and

selecting the amount of said first gas and the amount of said second gas in said flow of mixed gases in response to the



amount of phase correction needed in a predetermined portion of said beam cross-section.

H390

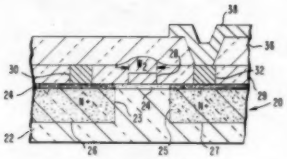
SELF-ALIGNED GATE MESFET AND THE METHOD OF FABRICATING SAME

Robert E. Lee, Thousand Oaks, and Harold M. Levy, Los Angeles, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation of Ser. No. 505,148, Jun. 17, 1983. This application May 28, 1986, Ser. No. 869,854

Int. Cl.⁴ H01L *29/80, 29/36, 29/48*

U.S. Cl. 357—22 **8 Claims**



1. A MESFET device comprising:

a substrate of semi-insulating III–V semiconductor material;

a doped active channel layer of III–V semiconductor material containing impurities of a selected conductivity type formed in a surface portion of said substrate;

first and second doped regions containing a heavier concentration of impurities of said selected conductivity type formed in said substrate at respective locations adjacent opposite ends of said channel layer;

a gate electrode contacting at least a portion of said active channel layer and positioned on said substrate surface between said first and second doped regions, the edges of said gate electrode being spaced from the respective edges of said first and second doped regions by a distance of from about 1000 Å to about 2000 Å, whereby a selected optimal ratio of parasitic source resistance to parasitic gate capacitance is achieved,

a layer of dielectric material formed on the surface of said substrate and overlying said gate electrode and said first and second doped regions; and

first and second ohmic contacts extending through said dielectric layer and electrically contacting said first and second doped regions.

H391

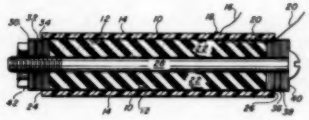
PIEZOELECTRIC POLYMER HYDROPHONE

Theodore A. Henriquez, and Allan C. Tims, both of Orlando, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 526,252, Aug. 25, 1983, abandoned. This application Jun. 23, 1986, Ser. No. 877,708

Int. Cl.⁴ H04R *17/00*

U.S. Cl. 367—159 **1 Claim**



1. A hydrophone, comprising:

a tube of outside diameter of approximately 1.2 cm comprising piezoelectric polyvinylidene, the wall thickness of which is substantially 0.05 cm;

an electrode of copper metal deposited on the exterior surface of said tube;

an electrode of copper metal deposited on the interior surface of said tube;

an elastomeric core with a central axial passage fitted within said tube, which core is composed of neoprene with Shore A hardness not exceeding 90 durometer; and

means for axially compressing said core to cause radial compression of said core against said tube.

H392

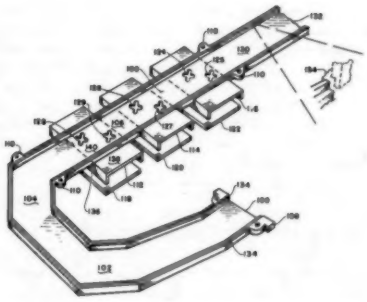
MICROWAVE WAVEGUIDE MANIFOLD AND METHOD

John H. Staehlin, Lutherville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 9, 1987, Ser. No. 36,524

Int. Cl.⁴ H01P *5/12*

U.S. Cl. 333—114 **10 Claims**



1. Microwave radio frequency waveguide manifold apparatus comprising the combination of:

a first microwave energy transmitting metallic waveguide member having a first unitary metal body portion of predetermined first cross sectional shape and a first metal closure member matable with said first body portion to form a first closed cross section waveguide;

a second microwave energy transmitting metallic waveguide member having a second unitary metal body portion of predetermined second cross sectional shape disposed adjacent and angularly crossover intersecting of said first waveguide first cross sectional shape,

said second waveguide member also including a second

metal closure member matable with said second body portion to form a second closed cross section waveguide; and

aperture means, of predetermined shape, size and waveguide residence location, communicating between said first and second waveguide cross sectional shapes through a crossover region common to each said waveguide for conveying microwave energy of predetermined electrical signal relationship between said waveguides;

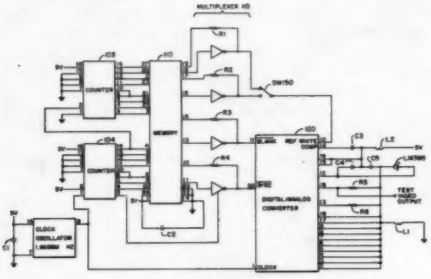
said first and second waveguide body portions and said crossover region common thereto comprising a unitary single common piece of electrically conductive metal;

whereby said predetermined electrical signal relationship within said waveguides is achieved and maintained free of inter-waveguide mechanical dimension variables including fitting tolerances, joining technique allowances, fillet variations, and fusing metal gaps.

H393
TELEVISION TEST SIGNAL GENERATOR

Carolyn S. Burt, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 18, 1987, Ser. No. 57,134
Int. Cl.[4] H04N *17/00*
U.S. Cl. 358—139 **3 Claims**



1. A television test generator comprising a clock means having an output, a counter having an input and an output, said input of said counter being connected to the output of the said clock means, and Erasable Programmable Read Only Memory (EPROM) having inputs and outputs, said EPROM having its inputs connected to the outputs of said counter means, a digital to analog converter having inputs connected to the outputs of the said EPROM whereby outputs of said converter will generate test video signals.

H394
FLEXIBLE COUPLING DEVICE WITH ELECTRICAL BONDING FOR METALLIC DUCTS

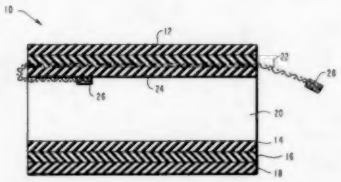
Neil J. Cleaton, St. Charles, Mo., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 12, 1987, Ser. No. 68,000
Int. Cl.[4] H05F *3/02*; F16L *11/12*
U.S. Cl. 361—215 **4 Claims**

1. A fluid coupling and electrical bonding device for joining sections of metallic ducting, said device comprising:

a sleeve having a cylindrical wall formed of flexible elastomeric material, said sleeve having a predetermined length and defining a lumen for receiving ends of duct sections to be joined;

a strip of electrically conductive wire mesh, said strip being longer than said predetermined length and having its



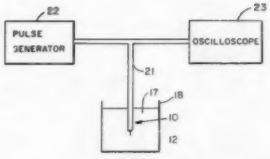
central portion embedded in said material so that extra length portions of said strip extend beyond said central portion at each end of said sleeves; and

said extra length portions of said strip being adapted to be bent inwardly of said lumen for engagement with the duct ends when joined by said device.

H395
PROCESS FOR MEASURING THE ELECTRICAL PROPERTIES OF LIQUIDS AND GRANULAR SUBSTANCES

Thomas F. Nash, Hunstville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 24, 1987, Ser. No. 70,770
Int. Cl.[4] G01R *27/04, 27/26*
U.S. Cl. 324—58.5 B **3 Claims**



1. A process for determining the electrical characteristics of a material, comprising

a. inserting a probe into the material, said probe being made up of a tubular outer conductor and an inner conductor coaxial with the outer conductor, said conductors being separated by a layer of insulating substance, said outer conductor and insulated substance terminating short of the end of the inner conductor to leave a portion of the inner conductor exposed,

b. transmitting an electrical pulse along the probe to establish an electrical field between the exposed portion of the inner conductor and the outer surface of the outer conductor and generate a reflected wave attenuated by the electrical characteristics of the material, and

c. displaying the reflected wave to observe said attenuation.

REISSUES

DECEMBER 1, 1987

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,551

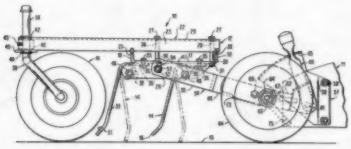
PUSHED DETHATCHING UNIT

Charles W. Doering, Louisville, Ky., assignor to Brinly-Hardy Co., Inc., Louisville, Ky.

Original No. 4,317,327, dated Mar. 2, 1982, Ser. No. 189,030, Sep. 22, 1980. Application for reissue Jul. 15, 1983, Ser. No. 513,821

Int. Cl.[4] A01D *7/06, 76/00*

U.S. Cl. 56—396 **60 Claims**



1. A pushed dethatching unit *for removing thatch material from a layer of thatch and* including:

frame means;

wheel means supported adjacent the front end of said frame means to support said frame means;

said frame means having at least one row of tines mounted thereon, each of said tines in each of said rows being non-rotary;

each of said tines in each of said rows of said tines being offset in the direction of motion of said dethatching unit from each of said tines in each of said other rows of said tines when there is more than one of said rows of said tines;

each of said tines having a lower portion *terminating in a tip* for engaging the material to be thatched;

and support means supported adjacent the rear end of said frame means to attach said frame means to pushing means to enable pushing of said dethatching unit by the pushing means, said support means and said wheel means cooperating to suspend the [bottom] tip of said lower portion of each of said tines above the ground so that no weight is applied to any of said tines when said dethatching unit is at rest, and each of said tines having the [bottom] tip of said lower portion beneath the point of attachment of said support means to the pushing means at all times[.];

said tines extending downwardly and forwardly from said frame means with each said tip disposed above the ground such that forward motion of said pushed dethatching unit causes said tine tips to deflect downwardly and rearwardly, upon contact with grass, and into contact with thatch material to tear contacted material loose from a layer of thatch. 30

* * * * *

The questions raised in reexamination request No. 90/000,405, filed 06/20/83, have been considered and the results thereof are reflected in this reissue patent which constitutes the reexamination certificate required by 35 U.S.C. 307 as provided in 37 CFR 1.570(e).

Re. 32,552

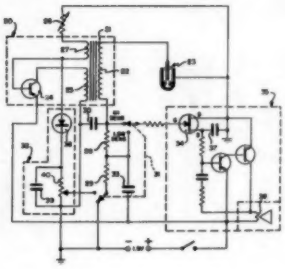
GASEOUS IMPURITY DETECTOR EMPLOYING CORONA DISCHARGE PHENOMENON

Leonard Liebermann, 2644 Ellentown Rd., La Jolla, Calif. 92037, and Stanley H. Lai, 4164 Hill St., San Diego, Calif. 92107

Original No. 3,742,475, dated Jun. 26, 1973, Ser. No. 124,794, Mar. 16, 1971. Application for reissue Nov. 14, 1980, Ser. No. 206,727

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—632 **5 Claims**



10. Apparatus for detecting halogen impurities in an ambient atmosphere comprising:

an asymmetrical electrode pair disposable in such ambient atmosphere;

a source of voltage pulses connected to the electrode pair, the voltage of said pulses being sufficient to cause a negative corona discharge across the electrode pair in the continuous corona region; and

means for indicating the mean corona current of said discharge, which is representative of the concentration of such impurity; wherein

said indicating means includes an R-C circuit in series with the electrode pair for providing an output voltage proportional to the time-average discharge current, said source of voltage pulses being connected to the electrode pair to produce a negative corona discharge thereacross;

said asymmetrical electrode pair includes a pointed electrode disposed opposite a substantially hemispherical electrode provided with openings to admit the atmosphere under test into the corona region; and

said source of voltage pulses includes a blocking oscillator having an output transformer, said output transformer including an output winding, one side of said output winding being connected in circuit with the pointed electrode and the other side of said output winding being connected in circuit with the substantially hemispherical electrode through said R-C circuit.

PLANT PATENTS

GRANTED DECEMBER 1, 1987

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,047

VARIETY OF NAVEL ORANGE TREE

Hermias C. Nieuwoudt, The Farm Korhaanshoogte, Citrusdal, Cape Province, South Africa

Filed Apr. 13, 1983, Ser. No. 484,597

Claims priority, application South Africa, Apr. 13, 1982, PT 263

Int. Cl.[4] A01H *5/03*

U.S. Cl. Plt.—45 **1 Claim**

1. A novel variety of navel orange tree substantially as shown and described, characterized by a firm, late-ripening fruit of slightly lighter than normal color with a thin peel which is not prone to splitting.

6,048

ALSTROEMERIA NAMED STALSAM

Jacob van Andel, Aalsmeer, Netherlands, assignor to Van Staaveren B.V., Aalsmeer, Netherlands

Filed Dec. 6, 1985, Ser. No. 806,264

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. The new and distinctive Alstroemeria plant, substantially as herein shown and described, distinguished by its unique color combination of its large lower petals and the contrasting coloring and the short pencil stripes spread over the length of its upper petals.

6,049

CARNATION NAMED "ELINOR"

Giacomo Nobbio, San Remo, Italy, assignor to Klemm & Sohn, Stuttgart, Fed. Rep. of Germany

Filed Nov. 1, 1985, Ser. No. 794,223

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—72 **1 Claim**

1. A new and distinct variety of carnation plant, substantially as herein shown and described, characterized by its high productivity of deep pink flowers supported singly on a sturdy, upright peduncle, flowers being characterized by having a deep pink color.

6,050

CHRYSANTHEMUM PLANT NAMED KARDO

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Oct. 10, 1985, Ser. No. 786,001

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Kardo, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; daisy capitulum type; yellow-orange ray floret color; diameter across face of capitulum of up to 11 cm at maturity; uniform nine week photoperiodic flowering response to short days; tall plant height when grown single stem; 18 to 33 cm peduncles on open, normally terminal sprays; slow development of green discs; and 13° C. minimum temperature tolerance for initiation and development of flowering buds with a 12 to 13 hour continuous dark period.

6,051

CHRYSANTHEMUM PLANT NAMED CALVEX

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Oct. 10, 1985, Ser. No. 786,000

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—79 **1 Claim**

1. A new and distinct Chrysanthemum plant named Calvex, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; decorative capitulum type; greyed-orange ray floret color; diameter across face of capitulum of up to 9 cm at maturity; uniform nine to ten week photoperiodic flowering response to short days; tall plant height when grown single stem; 20 to 25 cm peduncles on open, normally terminal sprays; and 13° C. minimum temperature tolerance for initiation and development of flowering buds.

6,052

CHRYSANTHEMUM PLANT NAMED ZILCON

William E. Duffett, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Oct. 10, 1985, Ser. No. 786,002

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—80 **1 Claim**

1. A new and distinct plant of *Dentrenthema morifolium*, Ramat., named Zilcon, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; decorative capitulum type; very light red-purple ray floret color; diameter across face of capitulum ranging from 6 to 8 cm. at maturity; uniform nine week flowering response; tall plant height when grown single stem; 25 to 30 cm. peduncles on open, normally terminal sprays; and 13° C. minimum temperature tolerance for initiation and development of flowering buds.

PATENTS

GRANTED DEC. 1, 1987

ERRATA

For CLASS	See PATENT NO.
437-005	4,709,466
437-030	4,709,467
437-209	4,709,468
437-063	4,709,469
109-021	4,709,659
439-078	4,709,973
439-345	4,709,974
439-350	4,709,975
439-350	4,709,976
065-004	4,710,216
437-040	4,710,234
437-162	4,710,241
437-228	4,710,264
437-029	4,710,265
512-020	4,710,316
437-235	4,710,398
437-245	4,710,399
379-424	4,710,596
238-380	4,710,614
382-056	4,710,938

PATENTS

GRANTED DECEMBER 1, 1987

GENERAL AND MECHANICAL

4,709,419
COVER GARMENT WITH INNER GARMENT ACCESS OPTION

Lynn E. Heyn, Woodstock; Malcolm L. Johnson, Atlanta, and Danial O. Fischer, Waleska, all of Ga., assignors to Kimberly-Clarke Corporation, Neenah, Wis.

Filed Aug. 27, 1984, Ser. No. 644,297
Int. Cl.[4] A41D *27/12, 27/20*
U.S. Cl. 2—46 **7 Claims**

1. A cover garment with inner garment access option means comprising,

(a) a cover garment adapted to be worn over inner, clothing to which access may be required, said garment providing protection against contamination, and

(b) means in said cover garment for forming hand holes in said cover garment adjacent at least one area of said inner garment to which access may be desired, said means comprising a weakened line of dimensions to allow the wearer's hand to pass through when opened, whereby the wearer may have the option of either maintaining the garment substantially free from access openings or, by applying stress to the weakened line, providing access to said inner garment.

4,709,420
SHAMPOO CAPE WITH SPLASH GUARD

Lillian Gettinger, Boca Ratan, Fla., assignor to Andre Fantasies, Inc., Ft. Lauderdale, Fla.

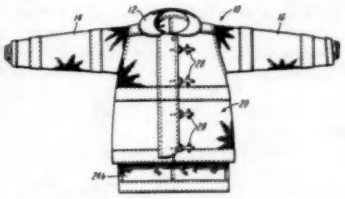
Filed Feb. 9, 1987, Ser. No. 12,289
Int. Cl.[4] A41D *13/04*
U.S. Cl. 2—50 **11 Claims**

1. A shampoo cape comprising a panel made of water impermeable material and having a neck opening surrounded by a neckband having an extension at one end thereof, said panel defining a front portion and a rear portion including right and left shoulder portions draping the user when the user's neck is received through said neck opening, said right and left shoulder portions defining a parting or separation line; and a capelette made of water impermeable material attached to said panel in the region of said neck opening and to said neckband including its extension and generally extendable over at least portions of said rear right and left shoulder portions to bridge said parting or separation line and substantially overlap said rear right and left shoulder portions, said capelette being adapted to be received within sink into which the user's hair is placed to be washed or shampooed when the user sits in a chair and reclines rearwardly to place the hair into the sink to thereby deflect water from the hair directly into the sink and substantially prevent water from impinging on said rear right and left shoulder portions, said front portion and the user's chair.

4,709,421
FIREFIGHTER'S COAT

William L. Grilliot, and Mary I. Grilliot, both of 1986 Home Ave., Dayton, Ohio 45417

Continuation of Ser. No. 733,195, May 13, 1985, Pat. No. 4,627,112. This application Dec. 1, 1986, Ser. No. 936,620
The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.
Int. Cl.[4] A41D *1/02, 13/00*
U.S. Cl. 2—81 **3 Claims**



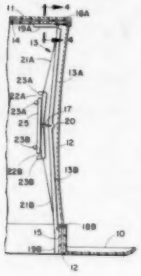
1. An improved firefighter's coat adapted for use with firefighter's pants extending downwardly from the waist of the firefighter to provide for full protection of the firefighter while also providing for less weight and improved freedom of movement and ventilation to reduce stress, comprising a jacket constructed of heat, flame and water resistant materials, the jacket including full length sleeve portions connected by a neck portion, a front portion and a rear portion, the front and rear portions being joined by opposing side portions, the front portion and side portion extending downwardly from the neck portion and having a lower edge disposed below the firefighter's waist and adjacent the upper part of the firefighter's legs, the rear portion extending between the side portions and extending downwardly from the neck portion and having a lower edge disposed significantly below the lower edge of the front portion and side portions and the lower edge being substantially above the knees of the firefighter to form a limited tail extension covering the lower rear part of the torso of the firefighter, the front portion and side portions thus being significantly shorter than the rear portion to provide the firefighter's legs with freedom of movement while crawling and climbing, in addition to improved ventilation under the front portion and side portions, the limited tail extension of the rear portion of the jacket protecting the lower rear part of the torso of the firefighter especially during forward bending or crawling, and the combined portions of the jacket also providing for reducing the total weight of the firefighter's coat.

4,709,422

SNAP ACTION HINGED SUPPORT FOR A COLLAPSIBLE TOP HAT

Engelbert J. Peham, 1302 Eleanor Ave., St. Paul, Minn. 55116

Filed Oct. 14, 1985, Ser. No. 918,083
Int. Cl.[4] A42B *1/20*
U.S. Cl. 2—180 **8 Claims**



1. In a collapsible top hat having a flat generally oval shaped top or crown, an oval shaped annular brim and a collapsible riser between the outer edge of the crown and the annular edge of the brim;

(a) a thin, generally oval shaped plate stiffener in the crown of the hat;

(b) a narrow, thin, stiff retainer band resting on edge along the inner annular edge of the hat brim;

(c) a plurality of extendible and foldable snap-action support members attached between said crown stiffener and said retainer band spaced apart around the hat riser, each of said support members comprising a pair of identical elongated leg members hindgedly attached together at one end and each having a hingedly attached foot member at the other end;

(d) means for attaching the foot on one of said legs to said stiffener plate;

(e) means for attaching the foot on the other of said legs to said retainer band; and

(f) resilient means coupled to each of said legs across said first mentioned hinge attachment for holding the ends of said legs at said hinge attachment abutting one another when the hat riser is extended and for holding said legs folded together when said hat riser is collapsed.

4,709,423

TOILET TANK DISPENSER

Randall G. Richards, Cincinnati, Ohio, assignor to The Drackett Company, Cincinnati, Ohio

Continuation of Ser. No. 608,672, May 4, 1984, abandoned, which is a continuation-in-part of Ser. No. 440,126, Nov. 8, 1982, abandoned. This application Dec. 10, 1986, Ser. No. 939,271
Int. Cl.[4] E03D *9/02*
U.S. Cl. 4—228 **14 Claims**

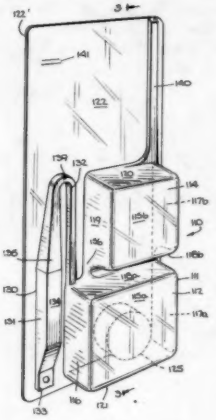
1. An in-tank toilet dispenser adapted to dispense a disinfectant aqueous solution into a toilet when the toilet is flushed, the dispenser comprising:

(a) a product chamber containing a disinfectant agent that releases as a function of time gaseous by-products form said aqueous solution, the product chamber having a lower portion and an upper portion;

(b) baffle means normal to the vertical plane of the product chamber and separating said lower and upper portions, there being a channel for fluid communication between said lower and upper portions in the vicinity of said baffle means;

(c) the cross-sectional area of the lower portion in a plane horizontal thereto being larger than a similar cross-section of the upper portion thus forming a shoulder at the interface of said portions;

(d) an inlet/outlet pathway in the form of an inverted U-shaped conduit having an exterior leg and an interior leg, the uppermost portion thereof wherein the legs are joined being arcuate in shape and having a volume of less than 0.50 cubic centimeter, gaseous by-product collecting in said uppermost portion during the time period between



two flushes of the toilet to isolate the lower chamber from ambient, said conduit being in fluid communication with said lower portion at the shoulder of the product chamber, where said upper portion does not overlie said lower portion, the cross-sectional area of the interior leg normal to flow being less than that of the exterior leg; and

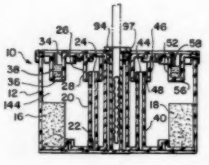
(e) vent means proximate the top of the upper portion of the product chamber.

4,709,424

AUTOMATIC TOILET BOWL CLEANER DEVICE

John E. Dolan, 15 New Main St., Haverstraw, N.Y. 10927

Filed May 10, 1985, Ser. No. 732,715
Int. Cl.[4] E03D *9/02*
U.S. Cl. 4—228 **1 Claim**



1. A toilet bowl dispenser comprising:

a container for dispensing a cleaning solution in flush water of a toilet tank, means for mounting said container in said tank below the water level of said flush water, said container including at least a bottom wall, a horizontal top wall in the form of a cover member having a planar upper surface; and a side wall; further including an opening in the bottom wall of said container, and a chamber for holding a cake of bleach or the like;

means for providing intake and discharge of flush water at the bottom of said container, responsive to the variation in the level of the flush water in said tank, said means including a first, straight conduit extending from said opening in the bottom wall of the container to a point near the top of

said container, said first conduit having an outer periphery and terminating in a first opening at said point;

a vent opening through said horizontal top wall;

a second straight conduit depending from the inner surface of said top wall and having an inner periphery larger than the outer periphery of said first conduit, said second conduit being of such length that its bottom end defines an overlap which surrounds the top end of said first conduit, said second conduit terminating in a second planar opening at said bottom end; the two conduits thus defined constituting an interrupted siphon within said chamber;

means for limiting the flow of cleaning solution from said vent opening, said means including the air space at the interior of said second conduit above said first conduit, which air space constitutes an air trap; said means for limiting further including the defined overlap of said second conduit with respect to said first conduit, which overlap extends approximately 0.100 inches;

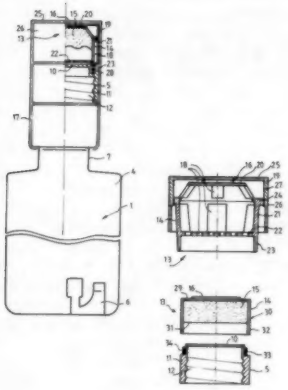
whereby, when flush water rises in said toilet tank, it initially flows through said first conduit and into said chamber without significant counterpressure to restrict the flow, until said chamber is completely filled and the level of tank water rises above the level of said vent opening such that the downward pressure acts to equalize the pressure of the rising water through said first conduit, air becomes trapped in said interior space, and flow from said container through said vent opening is halted; and, when said flush water drops within said toilet tank, the cleaning solution formed in said chamber is siphoned therefrom until a level is reached at the end of such second conduit.

4,709,425

HOLDER FOR A TOILET CLEANING PRODUCT ASSOCIATED WITH AN AIR DEODORIZER

Tristan Bavaveas, Paris, France, assignor to Eparco, Paris, France

Filed Oct. 15, 1986, Ser. No. 919,329
Claims priority, application France, Oct. 16, 1985, 85 15358
Int. Cl.[4] E03D *9/02*; B65D *53/06*
U.S. Cl. 4—228 **7 Claims**



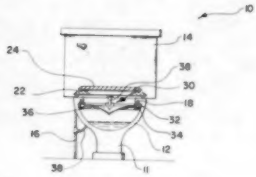
1. A holder for a toilet cleaning product comprising: a container for the cleaning product; a pre-use and pre-assembly closure member for the container; and a member for securing the container to the toilet; said closure member of the holder including an air deodorizer including a receptacle for a deodorizing substance and adhesive mans for releasably securing the deodorizer to the closure member, said deodorizer being physically separable from the holder but adapted to operate in conjunction therewith such that approximately the same amount of cleaning product and deodorizing substance are discharged over the same period of time; the closure member is adapted to integrally seal both the container and the deodorizer to define an inoperative state of the deodorizer; the closure member having on its transverse end walls a plurality of grooves which cooperatively engage projections extending downwardly from the deodorizer thereby retaining the deodorizer on the holder closure member in its desired position.

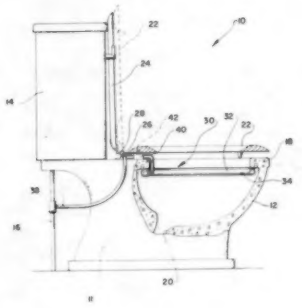
4,709,426

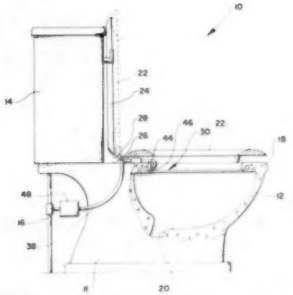
MEANS FOR PRODUCING A WATER SPLASH SHIELD FOR COMMODES, URINALS OR THE LIKE

Oliver W. Godwin, Jr., Lakeshore Dr., Dunn, N.C. 28334

Continuation of Ser. No. 92,490, Nov. 8, 1979, abandoned, which is a continuation-in-part of Ser. No. 16,188, Feb. 28, 1979, abandoned. This application Feb. 21, 1984, Ser. No. 582,055
Int. Cl.[4] E03D *9/00*; F15D *1/00*
U.S. Cl. 4—300.3 **16 Claims**







1. A sit down type water closet having a fluid urine splatter shield for preventing the splatter of urine, comprising a toilet bowl having a bottom that normally contains a volume of standing water having an upper surface, a side containing wall structure, and an opening formed about the top of said toilet bowl overlying said standing water, an outlet for urine and flush water to exit said toilet bowl, and a fluid urine splatter

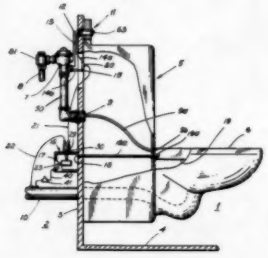
shield producing apparatus operatively associated with said water closet and toilet bowl for generating a generally horizontal sheet-like continuous shield of water between said toilet bowl opening and the upper surface of said standing water for preventing urine from splattering back upwardly from said standing water and out of said toilet bowl, said fluid urine splatter shield apparatus including an inlet fluid line communicatively connected to a fluid source; means communicatively connected to said fluid line for forming a fluid urine splatter shield between said toilet bowl opening and the upper surface of said standing water contained within the bottom of said toilet bowl, said means for forming said fluid urine splatter shield being disposed within said toilet bowl and extending at least partially around the opening intermediate the opening therein and the upper surface of said standing water and including means for spraying a generally horizontal sheet of water over and above the upper surface of said standing water and wherein the generally horizontal water shield substantially covers the opening formed within said toilet bowl so as to prevent urine from splattering back upwardly from the surface of said standing water as the fluid from said urine splatter shield mixes with uring being directed downwardly through the opening of said toilet bowl wherein the fluid urine splatter shield itself acts to intercept urine splattering upwardly from the surface of said standing water when one is urinating into said toilet bowl; and valve means operatively interconnected between said source of fluid and said fluid urine splatter shield means for selectively directing fluid from said fluid source through said inlet fluid line into said urine splatter shield means for producing the fluid urine splatter shield while one is urinating in said toilet bowl.

4,709,427

DISABLER SYSTEM FOR PLUMBING FIXTURE

Martin J. Laverty, Jr., Earlyville, Va., assignor to Coyne & Delany Co., Charlottesville, Va.

Filed Sep. 30, 1985, Ser. No. 781,944
Int. Cl.[4] E03D *11/00*
U.S. Cl. 4—427 **39 Claims**



1. In a toilet having a flush valve operating arrangement, including: toilet fixture for holding water;

a flush valve connected to said fixture;

a flush valve actuator assembly associated with said flush valve;

a remotely controlled operated unit;

a pair of tubes extending between said flush valve actuator assembly and said remotely controlled operated unit;

a third tube under water supply line pressure connected between said flush valve and said remotely controlled operated unit, means in said remotely controlled operated unit for connecting the water supply line pressure from said third tube with said pair of tubes for actuating said actuator assembly;

water level sensor means hydraulically connected with at least one of said pair of tubes and hydraulically connected with said fixture to be flushed;

said water level sensor means being responsive to water level in the fixture and including means for relieving water supply line pressure in said at least one of said pair of tubes when a predetermined water level is sensed for prevention of actuation of said flush valve actuator assembly by said remotely located operated unit to thereby prevent overflow of the fixture and flooding of a surrounding area; and

means between said fixture and said tubes for isolating said tubes from said fixture;

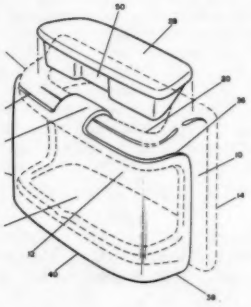
said isolating means being separate and apart from said fixture and preventing access to said tubes.

4,709,428

SOAP HOLDER COVER

Steven A. Garcia, 1729 Procyon, Rio Rancho, N. Mex. 87124

Continuation of Ser. No. 767,762, Aug. 21, 1985, Pat. No. 4,654,901. This application Oct. 27, 1986, Ser. No. 924,204
Int. Cl.[4] A47K *5/00*
U.S. Cl. 4—605 **1 Claim**



1. A soap holder cover for a conventional built-in, bathtub/-shower soap-holding fixture for preventing water from spraying or splashing on soap contained in said fixture, said fixture generally containing a bottom tray for holding soap, and a U-shaped support having two arms which extend outwardly from and are perpendicular to the bathtub/shower wall and which connect to a front-facing portion which is parallel to the bathtub/shower wall, said soap holder cover comprising:

(a) A shield comprising a curved, channel-shaped member, said curved shield having a front face which when positioned on a conventional bathtub/shower soap holding fixture, when provided, is generally parallel to the bathtub/shower wall, and further comprising two side faces which are generally perpendicular to the front face of said shield, said shield wrapping around the exterior of said soap-holding fixture with the upper edge of said shield being positioned generally at the U-shaped support of the soap-holding fixture and the lower edge of said shield being positioned generally at the soap tray level of said soap-holding fixture when said shield is seated in a closed position, and whereby the upper edge of the front face of the shield pivots about the front-facing portion of said U-shaped support which is parallel to the bathtub/shower wall; and

(b) Attachment means for attaching the upper edge of the front face of said shield to the front-facing portion of said U-shaped support, said attachment means enabling said shield to be rotated upwards and away from said soap tray to an open position to gain access to soap contained in said soap-holding tray, and further enabling said shield to be rotated downwards towards said soap tray to be seated in a closed position to prevent water from spraying or splashing into said soap-holding fixture; said attachment means is a strip which is made of the same material and integrally formed with said shield as a single unit and said strip being formed into a curved shape so as to wrap

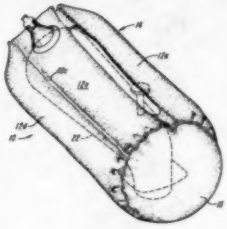
around the U-shape support and retain the cover thereto in said upwardly and downwardly rotated positions; whereby when said cover is positioned on the soap-holding fixture, the U-shaped support is exposed and may be utilized as a hand-hold for a bather.

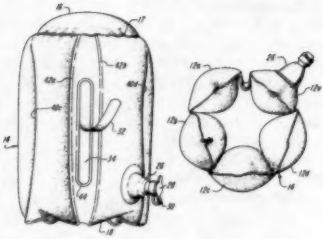
4,709,429

BATHTUB SPOUT COVER

Michael Lerner, Brookline; Michael Bernstein, Natick, and Robert Selame, Brookline, all of Mass., assignors to Safety 1st, Inc., Chestnut Hill, Mass.

Filed Aug. 13, 1986, Ser. No. 896,656
Int. Cl.[4] A47K *17/00, 13/00*
U.S. Cl. 4—661 **6 Claims**





1. A bathtub spout cover comprising:

a cover body for cushioning the bathtub spout including a plurality of inflatable side compartments attached along their edges to form a protective sleeve and an inflatable end compartment closing one end of said protective sleeve, the other end of said protective sleeve being open to permit the cover to be slipped over said bathtub spout, said side compartments having relatively small interconnecting air passages to enhance the impact cushioning ability of said bathtub spout cover;

means permitting inflation and deflation of said inflatable compartments; and

an opening in said protective sleeve for discharge of water from the end of said bathtub spout.

4,709,430

WEIGHTED BEACH BLANKET

Douglas E. Nicoll, 4637 Merrimack Ln., Virginia Beach, Va. 23452

Filed Dec. 8, 1986, Ser. No. 938,955
Int. Cl.[4] A47G *9/06*
U.S. Cl. 5—417 **15 Claims**

1. A multi-purpose weighted blanket for covering an area, comprising:

(a) a main body including a first flexible cloth panel,

(b) said first flexible cloth panel having a border formed in at least a portion of the outer perimeter thereof,

(c) means for removably anchoring said main body to a ground area,

(d) said anchoring means including a sealed continuous impermeable tubular member positioned within said border for maintaining said border in an elevated position at all times when said tubular member is not under a substantial pressure,

(e) said tubular member being formed from a non-rupturable heat resistant plastic material having a memory,

(f) said tubular member having a liquid weight means contained therein for removably anchoring said main body to a ground area,

(g) said liquid being returnable, upon removal of said substantial pressure, to any portion of the tubular member which may have collapsed due to said substantial pressure, and

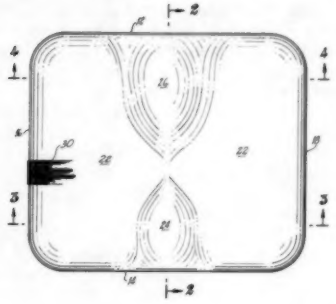
(h) said tubular member, when not acted upon by said pressure, having a substantially constant cross-sectional area either when the liquid weight means is contained therein or drained therefrom.

4,709,431

DUAL CROWNED HEMORRHOID SUPPORT SEAT CUSHION

Donald H. Shaktman, 1800 NE. 114th St., Apt. 910, Miami, Fla. 33181

Filed Dec. 2, 1985, Ser. No. 803,483
Int. Cl.[4] A47C *27/14, 27/22;* **A61F** *5/34;* **A61G** *7/04*
U.S. Cl. 5—481 **12 Claims**



1. A hemorrhoid relief cushion comprising a pressure-compensating fitting pad of a resilient, solid cellular composition capable of exerting a slight but effective pressure on hemorrhoids that counteracts the pressures applied to said hemorrhoids by veins in the vicinity of the anus of a user, said pad having an essentially rectangular outline including a pair of side edges free of cut-out portions and a contoured major surface, said contoured major surface including first and second elongated, continuously curved, convexly elevated portions, said first portion having a first elevational contour and being of relatively lesser size than said second portion and whose length extends transversely inwardly from adjacent the central portion of one of said side edges toward the other of said side edges, said second elongated, continuously curved, convexly elevated portion having a second elevational contour and being of relatively greater size that said first portion and

whose length extends transversely inwarly from adjacent the central portion of the other of a said side edges toward said first elongated, continuously curved, convexly elevated portion, said first elongated, continuously curved, convexly elevated portion being constructed and arranged to relieve hemorrhoids within the creased of a first person having a relatively small crease and said second elongated, continuously curv d, convexly elevated portion being constructed and arranged to relieve hemorrhoids within the crease of a second person having a relatively large crease.

4,709,432

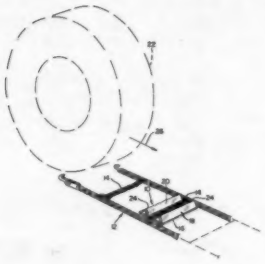
COMBINATION DEVICE FOR APPLYING TIRE CHAINS AND MOUNTING A JACK

Fred A. Barrick, 2091 SW. Tegart, Gresham, Oreg. 97030

Continuation of Ser. No. 656,743, Oct. 1, 1984, abandoned. This application Apr. 24, 1986, Ser. No. 858,571

Int. Cl.[4] B25F *1/00*; B60T *3/00*

U.S. Cl. 7—100 **1 Claim**



1. An apparatus for mounting tire chains on a tire having a predetermined tread diameter, comprising:

a rectangular flat, rigid base having parallel opposite edges;

a single pair of elongated parallel members, each parallel member extending along one of the parallel opposite edges and projecting upward from one side of the base, each of the members defining, in cross-section, a triangular shape in combination with the base;

the parallel members being of a height and spaced apart to support the tire at an elevation above the base such that a cross-linking member of a tire chain can be movably positioned between the pair of parallel members, the tire chain being spread on a support surface also supporting the base and an approaching tire;

the parallel members each having an upwardly-projecting angular apex of a predetermined height from the base and the base having a predetermined thickness providing a combined height from the support surface such that the tread of the tire approaching one of the parallel members transversely of the length thereof initially engages the apparatus in the area generally at the apex of said one member, said one member being oriented so that the apex grips the tire tread and frictionally engages the apparatus against the support surface to fix the apparatus in place so that the tire can roll onto the apparatus and be elevated and supported by the two parallel members above the base, the cross linking member of the tire chain remaining movable therebetween;

the parallel members being so disposed that the parallel members will nest together when a pair of apparatus are placed together with the one sides of their bases in facing relation with one parallel member of one of the pair of apparatus disposed between and adjacent to the two parallel members of the other of the pair of apparatus; and

means for mounting a jack on the other side of the base.

4,709,433

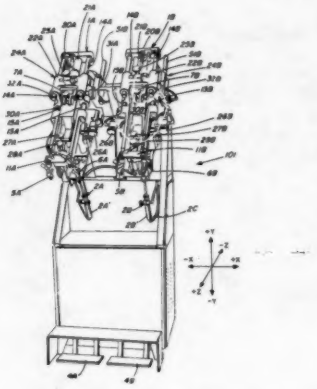
HEEL MOLDER FLANGER

William Walega, Hollis, N.H., assignor to International Shoe Machine Corporation, Nashua, N.H.

Filed Apr. 4, 1986, Ser. No. 848,174

Int. Cl.[4] A43D *21/00, 11/12, 21/12*

U.S. Cl. 12—12.5 **18 Claims**



16. A method of molding and flanging the heel region or portion of a footwear upper that includes a material that is flaccid above room temperature but is relatively rigid at room temperature, which method comprises:

stretching the heel region or portion about a mold shaped to the contour of the heel region or portion while simultaneously withdrawing heat energy from the heel portion or region;

providing a height gaging device to assure proper vertical positioning of the upper with respect to the mold, said height gaging device being movable from a spaced position relative to the mold to a position wherein it is in spring-loaded contact with the mold, the spring loading serving to permit the height gaging device to be moved to permit the upper to be mounted on the mold; and

flanging the margin of the upper at the heel region or portion.

4,709,434

DEVICE FOR CONTROLLING MOVEMENT OF A COPYING ROLLER

Josef Bis, and Antonin Petrzelka, both of Gottwaldov, Czechoslovakia, assignors to Tovarny Strojirenske Techniky Koncern, Prague, Czechoslovakia

Filed Jun. 13, 1986, Ser. No. 874,130

Claims priority, application Czechoslovakia, Jun. 13, 1985, 4261-85

Int. Cl.[4] A43D *95/00*; C14B *1/44*

U.S. Cl. 12—77 **3 Claims**

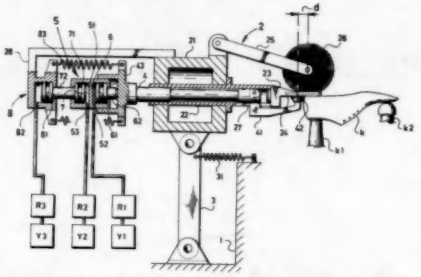
1. A device for controlling movement of a copying roller of a roughing machine relative to a treating brush for roughening a lasting margin of a tightened shoe upper, comprising a holder for the copying roller, which is slidably seated in a basic body of a treating head;

the basic body of the treating head being connected by means of a swing arm to a machine frame and the holder of the copying roller being terminated by a head, in which head there is seated a cylindrical body with two pressure cylinders with pistons;

the piston of the first of said two pressure cylinders being connected by means of a common piston rod to a piston of a third pressure cylinder, the piston of the second of said two pressing cylinders being in contact with said head by means of a piston rod, the third pressure cylinder piston is connected by means of a yoke to the basic body;

each of said pressure cylinders being individually connected to a distributor of a pressure medium, each distributor being controlled by an electromagnetic valve, each valve being electrically connected to each of four code switches;

two of said four code switches each being connected by input through a changeover switch to first outputs of respective flip-flops and controlled by selecting switches through an RS circuit, and the other two of said four code switches each being connected by inputs directly to first outputs of respective flip-flops, all of said flip-flops being connected to form a common shift register, the set input of one flip-flop being parallelly connected to reset inputs of the other flip-flops by means of an input branch, to which



input branch there is connected an output of a first product gate, the inputs of said first product gate being connected both to outputs of the selecting switches and to outputs of the RS circuit;

clock inputs of said flip-flops being interconnected to a collecting branch, to which there is connected an output of a shaping circuit, an input of said shaping circuit being connected to an output of a second product gate;

inputs of said second product gate being connected to position switches, said position switches being activated by corresponding position elements arranged on bars of a carriage of the tightened shoe upper, whereby the pressure cylinders may be selectively actuated singly or in combination so as to control the displacement of the copying roller relative to the treating brush.

4,709,435

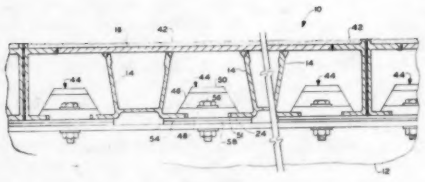
BRIDGE DECK SYSTEM

J. Robert Stemler, Murrysville; James D. Klingensmith, Apollo; Craig C. Menzemer, Murrysville; John M. Kulicki, Mechanicsburg, and Nicholas D. Theofanis, Camp Hill, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Feb. 4, 1987, Ser. No. 10,785

Int. Cl.[4] E01D *19/12*

U.S. Cl. 14—73 **6 Claims**



1. A bridge deck system, comprising:

a bridge structure which includes spaced apart parallel members:

a rectangular deck panel having a deck plate attached to parallel spaced apart lineal ribbed members spanning the spaced apart members of the bridge structure and with the ribbed members having flanges extending outwardly from each side thereof; and

a bracket attached between adjacent ribbed panel members to each of at least two of the parallel members of the bridge structure for connecting the deck panel thereto and having means for allowing movement of the deck panel in a lengthwise and sidewise direction independent of the bridge structure.

4,709,436

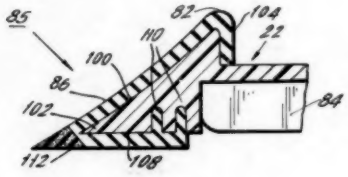
DEBRIS PAN FOR ROTARY BRUSH SWEEPER

Robert C. Berfield, Jersey Shore; Craig A. Seasholtz, Avis, and Richard M. Fegan, Cogan Station, all of Pa., assignors to Shop-Vac Corporation, Williamsport, Pa.

Continuation-in-part of Ser. No. 826,545, Feb. 2, 1986, abandoned. This application Oct. 16, 1986, Ser. No. 919,856

Int. Cl.[4] A47L *11/22*

U.S. Cl. 15—79 R **23 Claims**



1. A debris pan for a sweeper, comprising a pan body including an inlet portion for receiving debris propelled into the pan by the sweeper, the inlet portion being configured to be moved over a surface to be cleaned in close proximity thereto for normal cleaning operation; the inlet portion including a scoop with a first surface inclined upwardly and rearwardly, with respect to forward sweeper movement, for directing debris into the pan, and a second surface beneath the first surface and facing downwardly at any surface to be cleaned; the first and second surfaces of the scoop being provided with a covering of low friction material configured to mechanically grip onto the inlet portion.

4,709,437

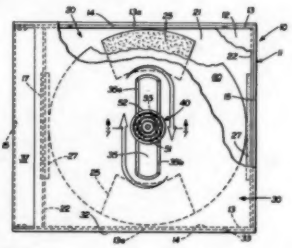
COMPACT DISC CLEANER

Bruce A. Hehn, Massillon, and James K. Sankey, Lynhurst, both of Ohio, assignors to Alpha Enterprises, Inc., Canton, Ohio

Filed Apr. 23, 1986, Ser. No. 854,905

Int. Cl.[4] B08B *7/00*

U.S. Cl. 15—97 R **18 Claims**



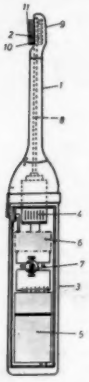
1. A device for cleaning a compact disc, comprising:

a housing, said housing having a bottom wall, and an optional pair of spaced end walls,

at least one cleaning pad, said cleaning pad located on said housing bottom wall,

a cover, said cover having an elongated slot therein, and a post assembly, said post assembly transversely and longitudinally mounted in said cover slot, and said post assembly having a first post end insertable into the central opening of a compact disc.

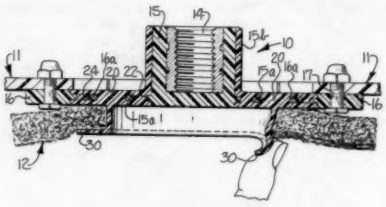
4,709,438
TOOTHBRUSH WITH GRAVITY SWITCH
Joaquim de Tavares, No. 35, Lehmweg, 2000 Hamburg 20, Fed. Rep. of Germany
Filed Mar. 31, 1986, Ser. No. 846,452
Int. Cl.[4] A46B *13/02*
U.S. Cl. 15—167 A **6 Claims**



1. A toothbrush provided with a headpiece carrying a brush and with a handle accommodating an electric motor with a battery and switching elements, the brush being formed cylindrically and performing a rotational movement about a rotational axis via a driving shaft extending between said brush and said electric motor for the purpose of dental care, wherein the cylindrical brush is provided with a protecting cap which is stationary with respect to said handle and, at a distance from the rotational axis of the brush, has an opening forming a free working region, the electric motor and thus the direction of rotation of the brush being reversible, a gravity switch, and first and second electrical circuit means connecting said motor to said switch, said gravity switch being arranged to close said first electrical circuit means and open said second electrical circuit means to drive said motor in one direction when said handle is in one position and to open said first electrical circuit means and close said second electrical circuit means to drive said motor in the opposite direction when said handle is turned about said axis from said one position to a further position such that the surface of said brush is automatically caused to move in a direction from the gums to the crown of each tooth by controlling the position of said handle.

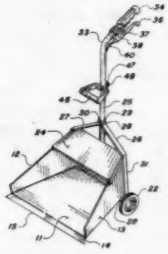
4,709,439
MOUNTING DISK FOR A FLOOR POLISHER
William L. Warren, Rte. 4 - Steeleberry La., and Mark V. Warren, 5808 Piney Top Dr., both of Charlotte, N.C. 28208
Filed Jul. 14, 1986, Ser. No. 885,858
Int. Cl.[4] A47C *11/14*
U.S. Cl. 15—230.16 **12 Claims**

1. A floor polisher mounting disk for mounting a floor polisher pad and the like for rotation from a motorized floor polisher, said mounting disk being characterized in that outer peripheral portions thereof may readily flex to facilitate accommodation of the polisher across thresholds and other raised portions along a floor, said mounting disk comprising a relatively stiff and hard hub portion, a relatively stiff and hard rim portion encircling said hub portion in spaced relation thereto, and resilient plastic means interconnecting said hub portion and said rim portion for providing a pliable interconnection between said hub portion and said rim portion, said plastic interconnecting means being formed of different and



less stiff material than said hub and rim portion and having a resilient lip extending from and positioned on the opposite side of the disk from said hub portion and adapted for mounting of inner peripheral portions of a polisher pad thereon.

4,709,440
MOBILE CLEAN-UP DEVICE
Elizabeth Y. Conelly, 2601 E. Lee St., Tucson, Ariz. 85716
Filed Apr. 8, 1987, Ser. No. 36,010
Int. Cl.[4] A47L *13/52;* **A01K** *29/00*
U.S. Cl. 15—257.3 **19 Claims**



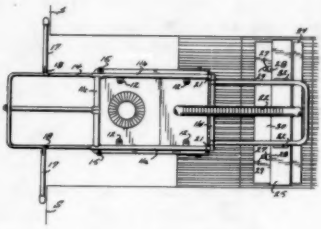
1. A mobile clean up device comprising a wheeled bse member having a leading edge, a trailing edge and first and second side edges; a first and second side member attached to said first and second side edges, respectively; a lip member secured to said leading edge and inclined downwardly therefrom; a rear plate secured to said trailing edge and extending upwardly therefrom; said rear plate having an upper portion rigidly secured to said side plates, a lower portion pivotally secured to said upper portion, and hinge means operatively interposed between said upper portion and said lower portion to pivot said lower portion between an open position and a closed position against said base member; latch means attached to said base member to secure said lower portion of said rear plate in said closed position; handle means detachably secured at one end thereof to said upper portion of said rear plate and extending upwardly therefrom; lever means secured to said handle means remote of said rear plate; and cable means operatively interconnected between said lever means and said latch means and responsive to movement of said lever means to disengage said latch means and permit said lower portion to move away from said base member in free pivotal movement about said hinge means in response to gravity thereupon and discharge trash from within said device.

4,709,441

ESCALATOR SWEEPING MECHANISM

Gene R. Center, San Diego, Calif., assignor to R. E. Baker Company, Inc., Santa Ana, Calif.

Filed Nov. 24, 1986, Ser. No. 934,684
Int. Cl.[4] A47L *5/38*
U.S. Cl. 15—301 **4 Claims**



1. A sweeper conformed for cleaning the moving surfaces of an escalator comprising:

a frame assembly;

a vacuum cleaner attached to said frame assembly;

a pivoted support structure pivotally mounted at one end of said frame assembly;

a transverse weighting element fixed across said support structure proximate the free end thereof;

a polishing pad mounted on said weighting element and conformed to rest on said moving surfaces of said escalator upon the pivotal deployment of said support structure;

a bristle element attached to said weighting element adjacent said pad; and

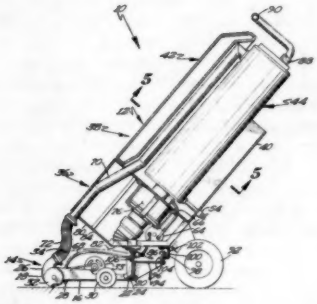
nozzle means deployed between said pad and said bristle element and connected for suction to said vacuum cleaner.

4,709,442

PORTABLE EXTRACTOR

William C. Sletten, II, Eden Prairie, Minn., assignor to Advance Machine Company, Plymouth, Minn.

Filed Oct. 21, 1986, Ser. No. 921,629
Int. Cl.[4] A47L *11/30*
U.S. Cl. 15—320 **30 Claims**



14. Apparatus for cleaning a surface comprising, in combination: a tool assembly having a front end and a rear end; means located adjacent the front end of the tool assembly for performing at least one cleaning process to the surface; means for providing mobility of the tool assembly upon the surface, with the mobility providing means located intermediate the rear end of the tool assembly and the cleaning process means; a body assembly having a bottom end; means for providing mobility of the body assembly upon the surface; and means for pivotally mounting the rear end of the tool assembly to the body assembly about an axis generally parallel to and spaced from the mobility providing means, with the axis of the pivotally mounting means being located so that the tool assembly pivots about the tool assembly mobility providing means into a transport mode of operation such that the cleaning process means is spaced from the surface when the tool and body assemblies are moved along the surface in a first direction and so that the tool assembly pivots about the tool assembly mobility providing means into a working mode of operation such that the cleaning process means engages the surface when the tool and body assemblies are moved along the surface opposite the first direction.

4,709,443

APPEARANCE FABRIC PANEL WITH IN SITU MOLDED FRAME

James E. Bigley, Warren, Ohio, assignor to The Scott & Fetzer Company, Twinsburg, Ohio

Filed Jun. 20, 1986, Ser. No. 877,005
Int. Cl.[4] A47L *9/00*
U.S. Cl. 15—339 **23 Claims**

1. In a vacuum cleaner having a housing, a vacuum motor unit for drawing dirt laden air into the housing, and an air permeable cover on the positioned on the outside of said for diffusing air exhausted from the vacuum motor unit, the cover comprising a porous fabric carried on a rigid framework, the framework being injection molded of polymeric material in situ on the fabric, the framework being molded in such a manner being sufficiently rigid to maintain said fabric in a generally taut condition and reduce any tendency for ballooning, puckering, sagging or the like without separate fasteners or adhesives, the cover being of sufficient size in relation to the remainder of the vacuum cleaner to contribute to its appearance.

4,709,444

WHEEL BRACKET MOUNTING STRUCTURE

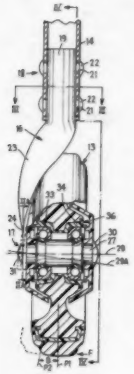
John W. Black, Hickory Corners, Mich., assignor to Standex International Corporation, Salem, N.H.

Continuation of Ser. No. 875,523, Jun. 19, 1986, abandoned, which is a continuation of Ser. No. 541,599, Oct. 13, 1983, abandoned. This application Jan. 28, 1987, Ser. No. 9,019
Int. Cl.[4] B60B *33/00*
U.S. Cl. 16—31 A **23 Claims**

1. A wheel bracket mounting structure, comprising:

a unitary elongated bracket member including a single axle mounting section to secure only one end of an axle member and a stem mounting section at generally opposite ends thereof, said axle mounting section including first means defining a generally flat, platelike portion vertically and horizontally offset from said stem mounting section, said axle member being rigidly secured and cantileverd to said flat, platelike portion, the axis of said axle member extending generally perpendicularly to the plane of said flat, platelike portion, said stem mounting section including second means defining an elongate stem means gener-

ally arcuate in cross-section adapted to be directly attached to a support member on a wheeled vehicle, said bracket member further including a first bulbously shaped structure means intermediate said first and second means for providing a smooth transition therebetween for resisting lateral elastic flexing so that said stem mounting section and said first bulbously shaped structure means are resistant to relative lateral elastic flexing, said stem mounting section and said first bulbously shaped structure means



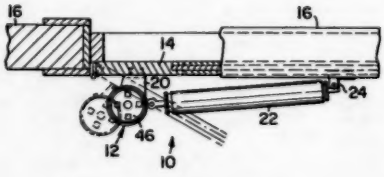
consisting of a majority of the length of said bracket member, and third means defining a region at the juncture between said flat, platelike portion and said first bulbously shaped structure means for allowing the material of said bracket in said region at said juncture to elastically flex relative to said first bulbously shaped structure means and said stem mounting section, said first bulbously shaped structure means and said stem mounting section having a greater resistance to lateral elastic flex characteristic than said region.

4,709,445

METHOD AND APPARATUS FOR CLOSING A DOOR

Russell W. Waldo, Mendota Heights, Minn., and Cardell E. Miller, Hudson, Wis., assignors to Ideal Security Hardward Corporation, Saint Paul, Minn.

Filed Aug. 13, 1985, Ser. No. 765,360
Int. Cl.[4] E05F *1/08*
U.S. Cl. 16—300 **8 Claims**



1. A door closer suitable for operatively connecting to first and second door assembly portions, wherein the first door assembly portion can assume first, second and third positions relative to the second door assembly portion, said door closer comprising:

(a) a first component;

(b) a second component, wherein said first component is movable between a first state and a second state relative to said second component;

(c) means for operatively connecting said first component to the first door assembly portion;

(d) means for operatively connecting said second component to the second door assembly portion, wherein said first component is movable from said first state to said second state relative to said second component in response to movement of the first door assembly portion from its first position to its second position relative to the second door assembly portion when said door closer is operatively connected to the first and second door assembly portions;

(e) means for applying a closing force between said first and second components comprising means for changing said closing force from a first closing force to a second closing force upon movement of said first component from said first state to said second state relative to said second component;

(f) means operatively connected to said first and second components for selectively locking said first component in said second state relative to said second component, thereby storing said second closing force by substantially eliminating relative movement between said first and second components;

(g) means operatively connected to said second component and said second component connecting means for selectively allowing relative movement therebetween, wherein the first door assembly portion can be selectively freely moved from its second position to its third position relative to the second door assembly portion when said door closer is operatively disposed relative to the first and second door assembly portions;

(h) means operatively connected to said first and second components for selectively unlocking said first and second components, thereby selectively allowing relative movement therebetween and restoring said second closing force, wherein said second closing force can be selectively associated with the third position of the first door assembly portion relative to the second door assembly portion when said door closer is operatively disposed relative to the first and second door assembly portions, the first door assembly portion comprising a door and the second door assembly portion comprising a door frame; and

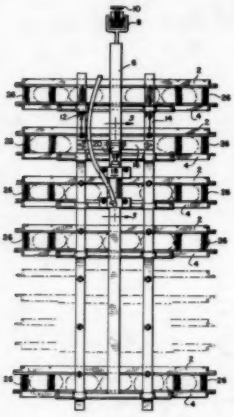
(i) said door closer being a torsional door closer; wherein said closing force applying means comprises a torsional spring having a longitudinal axis and first and second ends; wherein said first component comprises a first housing assembly and said second component comprises a second housing assembly; said first and second housing assemblies are coaxially aligned with and substantially encase said torsional spring; said first end of said torsional spring operatively engages said first housing assembly and said second end of said torsional spring operatively engages said second housing assembly; wherein said first and second housing assemblies are slidably engaged and normally rotatable with respect to one another and said first housing assembly comprises a first substantially cylindrical housing coaxially aligned with said torsional spring, and said first housing forms a plurality of locking slots and a first spring aperture suitable for receiving he first end of said torsional spring; said second housing assembly comprises a second substantially cylindrical housing and a sleeve operatively connected to said second housing, wherein said sleeve is fixed against rotation relative to said second housing and forms a second spring aperture suitable for receiving the second end of said torsional spring; said locking means comprises said sleeve and a locking ear extending therefrom; and wherein said first and second housings are selectively locked by operatively engaging said locking ear and one of said locking slots.

4,709,446

SMOKE HOUSE TREE

Leo Feauto, P.O. Box 12, Jackson, Nebr. 68743, and Harold Gill, 316 W. 15th, South Sioux City, Nebr. 68776

Filed Mar. 4, 1986, Ser. No. 836,112
Int. Cl.[4] A22C *7/00*
U.S. Cl. 17—1 R 4 Claims



1. A smoke house tree for pressing and shaping meat during a curing or smoking process:

a. a multiplicity of pairs of racks with each pair comprised of a fixed rack in a parallel plane with a movable rack;

b. a multiplicity of springs located between each of said fixed and movable racks which pull each of said movable racks toward its corresponding fixed rack independently of other pairs of racks;

c. a frame by which said smoke house tree is suspended, and to which said fixed rack of each of said pairs of racks is attached;

d. a member which is capable of displacement in a parallel fashion relative to said frame to which each of said movable racks is attached so as to displace said movable racks parallel to and away from said fixed racks in unison as said member is displaced;

e. means for displacing said member.

4,709,447

ENCASED PRODUCT AND METHOD AND APPARATUS FOR ENCASING SAME

Ray T. Townsend, Des Moines; David W. Smith, West Des Moines, and Robert M. Dykes, Urbandale, all of Iowa, assignors to Townsend Engineering Company, Des Moines, Iowa

Division of Ser. No. 731,995, May 8, 1985, Pat. No. 4,660,255. This application Dec. 12, 1986, Ser. No. 941,083
Int. Cl.[4] A22C *13/00*
U.S. Cl. 17—1 F 5 Claims

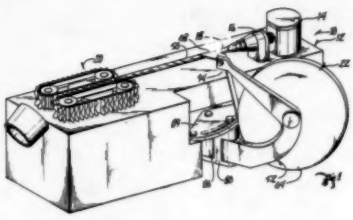
1. An encased product comprising:

an elongated flexible casing being cylindrically shaped substantially along it length and having opposite end closures, said casing forming an enclosed product cavity;

a product material filling said cavity and maintaining said casing in said cylindrical shape;

said cylindrical casing being formed from an elongated strip of flexible material having opposite side edges, said strip being formed into a plurality of helical revolutions with said side edges of said strip within each one of said helical revolutions frictionally engaging and overlapping the said side edges within those of said helical revolutions adjacent said one revolution;

said side edges being sufficiently overlapped to create enough frictional cohesiveness to maintain said strip of



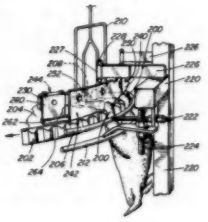
flexible material in a self-contained flexible casing to contain said product material.

4,709,448

HOCK CUTTING MECHANISM

Bernie McGuire; Robert S. Innes, and Stefan Pagowski, all of Hamilton, Canada, assignors to Canadian Bird Equipment Limited, Ontario, Canada

Continuation-in-part of Ser. No. 617,550, Jun. 5, 1984, Pat. No. 4,660,256. This application Dec. 17, 1986, Ser. No. 942,980
Int. Cl.[4] A22C *21/00*
U.S. Cl. 17—11 14 Claims



1. A knife mechanism for severing the lower legs from a poultry carcass at the hock joint as the knife mechanism and carcass are moved relative to each other with the lower legs oriented generally normal to the working edges of the knife mechanism and fixed against movement normal to the relative movement, the knife mechanism comprising:

(a) a first knife means having a blunt working edge, that blunt working edge being adapted to extend into the hock joint of each leg to increase the spacing between the ball and the socket of the joint, connective tissue at the joint being thereby pressed between the ball and the socket of the joint:

(b) a second knife means having a sharp working edge, that sharp working edge being positioned so as to be in the path of the hock joint and being oriented generally parallel to the working edge of the first knife means, the sharp working edge of the second knife means being adapted to sever at least a portion of the connective tissue; and

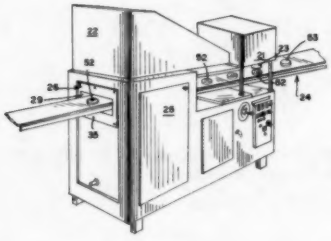
(c) a third knife means having a working edge oriented to press the connective tissue in a direction opposite to that in which that tissue is pressed by the working edges of the first and second knife members, at least a portion of the working edge of the third knife member being sharp and acting to sever any connective tissue not severed by the second knife means.

4,709,449

PASS-THROUGH PROTEINACEOUS PATTY MAKING APPARATUS

Alvin Borsuk, Madison, Wis., assignor to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Feb. 13, 1986, Ser. No. 829,581
Int. Cl.[4] A22C *7/00*
U.S. Cl. 17—32 6 Claims



1. A pass-through proteinaceous patty making apparatus, comprising:

proteinaceous patty forming means for forming proteinaceous patties and depositing same on a moving conveyor belt assembly, said proteinaceous patty forming means being located substantially above the conveyor belt assembly, and wherein said proteinaceous patty forming means includes a mold plate and pusher assembly having a mold plate member with at least one mold cavity for forming a proteinaceous patty therewithin;

a cabinet having a generally horizontally oriented tunnel assembly through at least a portion of the horizontal longitudinal extent of the cabinet, wherein said cabinet houses at least a portion of an assembly for driving said proteinaceous patty forming means, wherein said assembly for driving said proteinaceous patty forming means includes a transverse shaft in operative engagement with said mold plate member and two drive arms, each drive arm being mounted onto opposite ends of said transverse shaft, and wherein said drive arms are engaged by drive means for moving said drive arms with back-and-forth motion, whereby said mold plate member oscillates between an orientation thereof for forming and for depositing the patties;

said conveyor belt assembly includes an elongated endless belt member which traverses a path substantially throughout the horizontal longitudinal extent of the cabinet, including through said tunnel assembly and under said patty forming means; and

timing means associated with said conveyor belt assembly and with said proteinaceous patty forming means, said timing means being for depositing a proteinaceous patty from said proteinaceous patty forming means onto an item that had been deposited onto the elongated endless belt member upstream of said tunnel assembly.

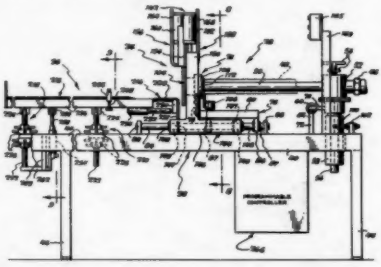
4,709,450

APPARATUS AND METHODS OF STUFFING FOOD CASINGS TO PROVIDE DIMENSIONALLY UNIFORM PRODUCTS

Thomas R. Stanley, Downers Grove, and Mark R. Zeleznik, Oak Forest, both of Ill., assignors to Teepak, Inc., Oak Brook, Ill.

Filed Jan. 13, 1987, Ser. No. 2,831
Int. Cl.[4] A22C *11/02*
U.S. Cl. 17—49 12 Claims

1. A food casing stuffing apparatus comprising a stuffing horn with an inlet for receiving a pressurized food material, an outlet downstream from said inlet for delivering the food material to a casing thereon and a shaft intermediate to said inlet and outlet; means for engaging the casing against said shaft for restricting the rate of release of casing therefrom; carriage means for translating said casing engaging and restricting means along the axis of said stuffing horn; said casing engaging and restricting means including means for preventing the backflow of food material over the stuffing horn when said backflow preventing means is removed from the shaft by said carriage means; means for closing off filled casing, and means for controlling the length of the interval from actuation of said closing off means to actuation of said carriage means for removing said backflow preventing means from said shaft.



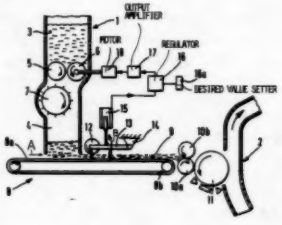
10. A method for stuffing a strand of food casing, which comprises the steps of loading a strand of casing for stuffing at a filling station; stuffing the casing with the food material at said filling station while applying a force to restrict the rate at which unfilled casing is released for stuffing; closing the trailing end of the filled casing at a clipping station, and controlling the interval for withdrawing said force restricting the rate of release of unfilled casing at the filling station when the trailing end of the filled casing is closed so that the length of the interval is directly proportional with the viscosity of the food material.

4,709,451

METHOD AND APPARATUS FOR FEEDING A FIBER TUFT OPENER OR CLEANER

Ferdinand Leifeld, Kempen, Fed. Rep. of Germany, assignor to Trützschler GmbH & Co. KG, Monchen-Gladbach, Fed. Rep. of Germany

Filed Oct. 3, 1986, Ser. No. 915,128
Claims priority, application Fed. Rep. of Germany, Oct. 5, 1985, 3535684
Int. Cl.[4] D01G *15/40*
U.S. Cl. 19—105 10 Claims



1. A method of feeding a fiber lap to an opening roller of fiber processing machine, comprising the following steps:

(a) delivering fiber tufts by discharge rollers forming part of a fiber tuft feeder;

(b) forming a loose fiber tuft mass from the fiber tufts delivered by the discharge rollers;

(c) forming a thin fiber lap from the loose fiber tuft mass by depositing the loose fiber mass on a traveling conveying surface;

(d) advancing the fiber lap by the conveying surface to said opening roller;

(e) sensing fluctuations in quantity characteristics of the running fiber lap at a location situated upstream of the opening roller as viewed in the direction of fiber lap advance;

(f) generating electric signals representing said fluctuations; and

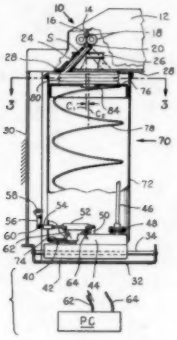
(g) varying the rpm of said discharge rollers as a function of the electric signals for maintaining quantity characteristics of said fiber lap uniform.

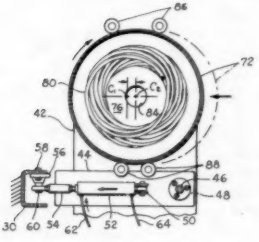
4,709,452

METHOD AND MEANS OF COILING START-UP WHICH PREVENTS SLIVER SLINGOVER

Edward J. Cooley, Easley, and Franklin D. Shaw, Seneca, both of S.C., assignors to Platt Saco Lowell Corporation, Easley, S.C.

Filed Jun. 6, 1985, Ser. No. 742,165
Int. Cl.[4] B65H *54/80*
U.S. Cl. 19—159 R **15 Claims**





1. In an apparatus for filling a cylindrical can with coils of sliver, including means for receiving strand sliver, means for coiling said strand silver to form a coiled silver by passing it through a rotating inclined tube having a fixed tube axis of rotation, means for depositing said coiled sliver in coils atop a spring biassed false bottom of a cylindrical sliver can, and means for rotating said can upon a platform therefor about a platform axis of rotation for said platform, the improvement comprising:

means for shifting the position of said platform and said platform axis of rotation between an initial position wherein said platform axis is aligned parallel to said fixed tube axis at a prescribed and predetermined distance of separation therebetween, and a second position wherein said platform axis is aligned parallel to said fixed tube axis at a second predetermined and prescribed distance of separation therebetween, and wherein said second distance of separation is greater than said first distance of separation by a prescribed amount; and

control means for controlling said means for shifting, including measuring means for measuring the delivery of strand sliver deposited as coils, powering means for powering said shifting means, and actuating means for actuating and deactuating said measuring means and for actuating and deactuating said powering means;

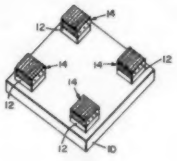
whereby, upon said measuring means being actuated, or deactuated, said means for shifting is powered by said powering means and shifts said platform from said second position to said first position, and then upon said actuating means actuating said measuring means and said measuring means measuring out a predetermined amount of sliver for delivery to said can, said means for shifting again is powered by said power means to shift said platform from said initial position to said second position.

4,709,453

SEPARABLE FASTENING DEVICE

Andrew C. Harvey, Waltham; William A. Ribich, Lexington; Paul J. Marinaccio, East Orleans, all of Mass., and Bernard E. Sawaf, Nashua, N.H., assignors to Foster-Miller, Inc., Waltham, Mass.

Filed Oct. 14, 1986, Ser. No. 918,777
Int. Cl.[4] A44B *13/00*
U.S. Cl. 24—442 **25 Claims**



1. A separable fastener device comprising a fastener member that includes a series of metal hook sheets disposed in stacked relation,

each said hook sheet having a planar body portion and a series of hook elements disposed along one edge of said body portion, each said hook element having a stem portion and a head portion that includes a deflecting surface for deflecting a fastener portion of a cooperating fastener member and a latch portion for engaging a portion of a cooperating fastener member in fastening relation.

4,709,454

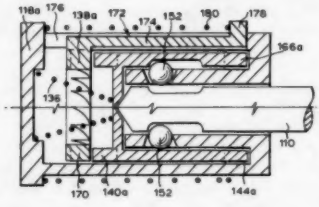
AXIAL LOCKING DEVICE

Austen B. Barnes, 5040 Coronation Road, RR2 Whitby, Ontario, LIN 5R5, Canada

Filed Dec. 13, 1985, Ser. No. 808,724
Claims priority, application United Kingdom, May 29, 1985, 8513474
Int. Cl.[4] A44B *19/00*
U.S. Cl. 24—590 **8 Claims**

1. A releaseable axial locking device comprising two separable members adapted to be locked together and unlocked by relative axial movement of either of said two separable members in one direction, a slider juxtaposed one of said two separable members, said slider being movable axially relative to said one of said two separable members, resilient means interposed said slider and said one of said two separable members such that when the two members are moved axially relative to one another in said one direction said slider engages the other of said two separable members, and means for displacing said slider in an angular direction as it is moved axially against said resilient means so that the angular displacement of said slider which occurs when said two separable members are moved

relative to each other in said one direction results in said two separable members being locked relative to one another and subsequent angular displacement of said slider which occurs



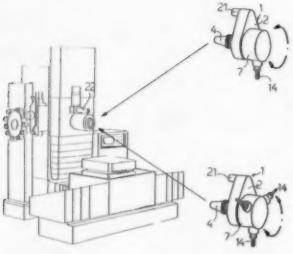
when the two locked members are again moved relatively to one another in said one direction results in said members being unlocked and thereby axially separable in a direction opposite to said one direction.

4,709,455

MILLING AND DRILLING HEAD FOR A MACHINE TOOL

Ermanno D'Andrea, and Nicola D'Andrea, both of Lainate, Italy, assignors to D'Andrea S.p.A., Lainate, Italy

Filed Oct. 15, 1985, Ser. No. 787,307
Int. Cl.[4] B23B *43/00*; B23C *3/34*
U.S. Cl. 29—40 **8 Claims**



1. A milling and drilling head, in combination with a machine tool that has a master spindle, a control spindle and a numerical-control unit; said head comprising:

a stationary case portion;

an input shaft rotatably mounted to the stationary case portion and adapted for coupling with the master spindle of the machine tool to receive mechanical rotation therefrom;

a movable case portion mounted to the stationary case portion for substatially continuous rotation;

at least one bit-holding spindle rotatably mounted to the movable case portion for rotation at an angle to the rotation of the input shaft so that the bit-holding spindle is substantially continuously adjustable in disposition relative to the input shaft;

first rotation-transmitting means interconnecting the input shaft and the at least one bit-holding spindle, to transmit rotation from the input shaft through said angle to the bit-holding spindle;

a control shaft rotatably mounted to the stationary case portion, and adapted for coupling to the control spindle of the machine tool to receive substantially continuous adjustment rotationally therefrom;

second rotation-transmitting means interconnecting the control shaft and the movable case portion, to transmit substantially continuous adjustment from the control shaft to the movable case portion rotationally, to substantially continuously adjust the disposition of the bit-holding spindle relative to the input shaft;

the numerical-control unit of the machine tool, in use, controlling the master-spindle rotation to supply cutting rotation to the bit-holding spindle and simultaneously controlling the control-spindle rotation to substantially continuously adjust the disposition of the bit-holding spindle during cutting;

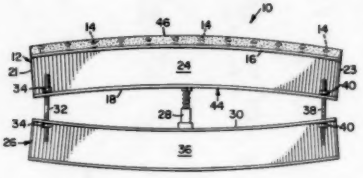
whereby the machining tool and said head in combination provide machine at angles which vary continuously, including formation of compound shapes in curved surfaces.

4,709,456

METHOD FOR MAKING A PRESTRESSED COMPOSITE STRUCTURE AND STRUCTURE MADE THEREBY

Srinivasa L. Iyer, Rapid City, S. Dak., assignor to Stress Steel Co., Inc., Rapid City, S. Dak.

Continuation-in-part of Ser. No. 585,824, Mar. 2, 1984. This application Mar. 4, 1986, Ser. No. 836,018
Int. Cl.[4] B23P *17/04*
U.S. Cl. 29—155 R **20 Claims**



1. A method for rehabilitating a ferroconcrete bridge girder having a concrete layer and a steel beam, the steel beam having a center region and the girder being attached at its ends to attachment points, the method comprising the steps of:

(a) positioning a crane lifting apparatus proximate the center region of the steel beam;

(b) operatively attaching the lifting apparatus to the center region of the steel beam;

(c) lifting the girder by operating the lifting apparatus, thereby bending the steel beam and causing the concrete layer to crack;

(d) removing the cracked concrete layer from the steel beam;

(e) adding shear connectors to the steel beam;

(f) casting a new layer of concrete on the steel beam, with the steel beam remaining bent while the new layer of concrete is cast thereon;

(g) curing a new layer of concrete to the point that it can absorb compressive stresses created by the steel beam; and

(h) removing the lifting apparatus from out of contact with the steel beam, thereby causing the steel beam to no longer remain bent after the lifting apparatus is removed, wherein the rehabilitated bridge girder is prestressed and can carry greater loads than the former girder.

4,709,457

PROCESS FOR MANUFACTURING A TURBINE OR COMPRESSOR WHEEL MADE OF COMPOSITE MATERIAL AND WHEEL THUS OBTAINED

Bernard Broquere, Bordeaux, and Jacques Etienne, Le Taillan-Medoc, both of France, assignors to Societe Europeenne de Propulsion, Puteaux, France

Filed Aug. 9, 1985, Ser. No. 764,662
Claims priority, application France, Aug. 13, 1984, 84 12740
Int. Cl.[4] B21K *3/00*
U.S. Cl. 29—156.8 R **4 Claims**

1. A process for manufacturing a turbine or compressor

wheel made of composite material, said process comprising the following steps of:

making at least two helicoidal textures each formed by weaving a spiral band with helicoidal warp yarns and weft yarns which are substantially perpendicular to the axis of the texture,

assembling the helicoidal textures by "screwing" them in each other and stacking them by mutually approaching their interlaced turns, and

densifying the stack thus made to obtain a preform of a turbine or compressor wheel.

4,709,458

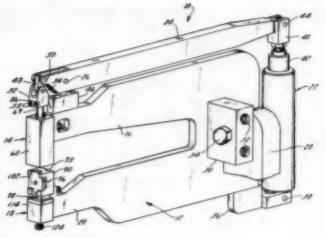
FASTENING OVERLAYING SHEETS BY PUNCH AND DIE APPARATUS

Mark C. Peters, 1357 Meadowcreek, Pewaukee, Wis. 53072

Filed Oct. 11, 1985, Ser. No. 786,680

Int. Cl.[4] B23P *11/00*

U.S. Cl. 29—243.5 **17 Claims**



1. A punch and die assembly for forming a spot clinch joint between two or more laminated sheets, said assembly comprising a frame, a die cartridge mounted on said frame, said die cartridge supporting said laminated sheets and including an anvil mounted in said die cartridge, means for biasing said anvil toward said laminated sheets, adjusting means for limiting the motion of the anvil to correspond to variations in the thickness of the laminated material and moveable means on one side of said anvil for providing room for expansion of the spot clinch joint on one side of said anvil; a punch cartridge mounted on said frame in a spaced relation to said die cartridge, said punch cartridge including a punch mounted in said cartridge for reciprocal motion toward and away from said anvil; and a power source mounted on said frame and being operatively connected to move said punch through a continuous cycle of motion whereby a spot clinch joint will be formed in the laminated sheet material in each cycle of motion of the punch.

4,709,459

ASSEMBLY DEVICE FOR AXLE BEARINGS AND/OR WHEEL FLANGE HUBS OF MOTOR VEHICLES

Horst Klann, Terra Wohnpark 12, 7730 Villingen-Schwenigen 24, BRD, Fed. Rep. of Germany

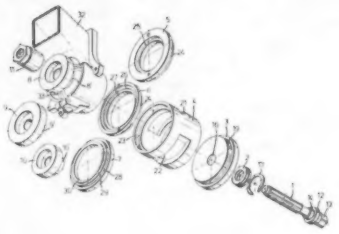
Filed Aug. 26, 1986, Ser. No. 900,369

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1985, 3530983

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—263 **12 Claims**

1. An assembly device for pressing a first member into the opening of a second member, in particular for axle bearings and/or wheel flange hubs of a motor vehicle, comprising a threaded spindle having an axis, an axial support bearing concentric with said axis, said axial support bearing having a hole therethrough for closely receiving a portion of said threaded spindle for centering said threaded spindle with respect to said axial support bearing, a tubular spacer concentric with said axis, said tubular spacer having a bore with said threaded spindle extending centrally through said bore, said tubular spacer having a face wall on one end thereof adjacent said axial support bearing, said axial support bearing being concentrically engaged with said face wall, said face wall partly closing said bore and having a hole therethrough axially aligned with said hole of said axial support bearing, an annular pressure transmitting part concentric with said axis, said pressure transmitting part having a hole therein for receiving said threaded



spindle, said hole of said pressure transmitting part being axially aligned with said hole of said axial support bearing, said pressure transmitting part having an annular disc portion and at least one annular centering pilot portion extending axially of said disc portion in a direction toward said axial support bearing, said tubular spacer having at least one annular support shoulder at an end of said tubular spacer opposite from said face wall thereof, said annular support shoulder being disposed around said bore for engaging the second member, said pressure transmitting part being engageable with the first member, and a nut threaded to said threaded spindle near an end of said spindle opposite from said axial support bearing for pressing said pressure transmitting part toward said annular support shoulder for pressing the first member into and out of the second member.

4,709,460

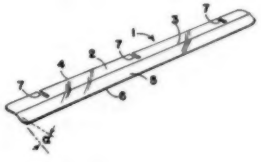
PANEL INSTALLATION TOOL AND METHOD

Vladimir Luhowyj, 2209 W. Erie, Chicago, Ill. 60612

Continuation of Ser. No. 742,904, Jun. 10, 1985, abandoned. This application Dec. 10, 1986, Ser. No. 939,273

Int. Cl.[4] B25B *11/00*

U.S. Cl. 29—271 **10 Claims**



1. A combination support and guide tool for installing rectangular, flat ceiling or wall panels by a single person onto regularly spaced, parallel structural members of a building such as ceiling joists or wall studs, said tool comprising:

support and guide plate means for supporting one of said panels as the one panel is installed against said parallel structural members, said means comprising

(a) an elongated rigid support plate with a length defined by a longitudinally extending front leading edge and back trailing edge, and a width much smaller than its length defined by two side edges, said length being sufficient to transversely span a plurality of said parallel structural members, said support plate containing a plurality of slot openings which start at its trailing edge and which are spaced along its length for alignment with at least two of said parllel structural members, said slot openings having side edges extending forwardly from said trailing edge toward the leading edge in order to receive a fastening element, and further comprising

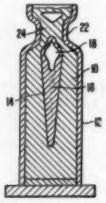
(b) an elongated rigid guide plate connected to the leading edge of said support plate such that the guide plate forms an acute angle of substantially less than 45° with reference to a planar extension of the support plate beyond its leading edge.

4,709,461

METHOD OF FORMING DENSE INGOTS HAVING A FINE EQUIAXED GRAIN STRUCTURE

William R. Freeman, Jr., Easton, Conn., assignor to Howmet Turbine Components Corporation, Greenwich, Conn.

Filed Feb. 10, 1986, Ser. No. 827,541
Int. Cl.[4] B23P *17/00*
U.S. Cl. 29—526.3 **16 Claims**



1. A method of casting a metal ingot having a substantially eqiaxed grain, cellular, nondendritic microstructure uniformly through said ingot, said method comprising the steps of:

(a) melting a metal to form a molten metal;

(b) reducing the temperature of said molten metal to remove almost all of the superheat in said molten metal to form a molten casting metal consisting of liquid metal;

(c) placing said molten casting metal in a mold, said mold including a mold cavity and means for accelerating solidification of metal at the entrance to said mold cavity;

(d) blocking the entrance to said mold by solidifying said molten casting metal in said entrance before solidification is complete in the remainder of said mold cavity;

(e) solidifying said molten casting metal in said mold by extracting heat therefrom at a rate to solidify said molten casting metal to form said ingot having said microstructure, said ingot having a shrinkage void beneath the blocked entrance to said mold; and

(f) hot isostatically pressing said ingot to eliminate voids within said ingot.

4,709,462

METHOD FOR ASSEMBLING A WELL DRILLING TOOL

Gregg S. Perkin, Kingwood, Tex., and Duane D. Papke, Didsbury, Canada, assignors to Oil Patch Group, Inc., Canada

Filed Aug. 4, 1986, Ser. No. 892,315
Int. Cl.[4] B23P *11/00;* **E21B** *9/22, 17/10*
U.S. Cl. 29—434 **5 Claims**

1. A method of assembling a roller cutter on a drilling tool including the steps of:

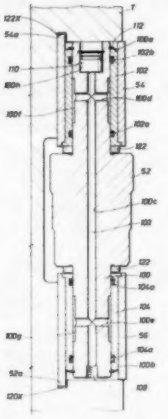
mounting a roller cutter on a shaft;

placing a bearing block on each end of the shaft;

positioning the bearing blocks and mounted shaft and roller cutter on a drilling tool;

sliding each of the bearing blocks axially on the shaft to position a portion of the bearing block in bearing block recesses formed by the drilling tool;

securing the bearing blocks with the drilling tool; and



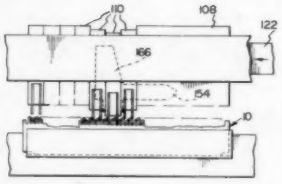
installing at least one resilient C-shaped spacer on the shaft between a secured bearing block and the roller cutter to position the roller cutter at the optimum cutting location between the bearing blocks.

4,709,463

APPARATUS FOR CONNECTING CONDUCTORS TO TERMINALS OF A CROSS-CONNECT CONNECTOR FOR COMMUNICATION LINES

Alex G. Cristescu, Montreal, and Christopher A. Conea, Roxboro, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Nov. 8, 1985, Ser. No. 796,457
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—566.3 **11 Claims**



1. Apparatus for electrically connecting a group of insulated conductors along a row of terminals of a cross-connect connector, said apparatus having an assembly station and comprising:

means disposed at one side of the assembly station for holding the connector in the assembly station;

an insertion tool carrier located at the other side of the assembly station;

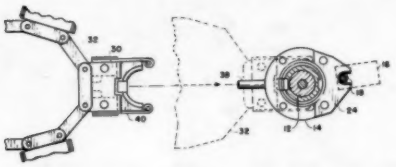
a plurality of conductor insertion tools mounted in a planar group and in slidable side-by-side relationship within the insertion tool carrier for sliding movement towards and away from the holding means; and

insertion tool operating means comprising an operating shaft reciprocally movable in the direction of the plane of the planar group transversely of the direction of sliding movement of the tools, said shaft connected to the tools to cause the tools to slide relative to one another and in sequence towards and away from the holding means.

4,709,464
INDEXING MECHANISM FOR COMPUTER CONTROLLED MILLING MACHINES

Richard J. Speroni, 29256 Union City Blvd., Union City, Calif. 94587

Filed Mar. 6, 1986, Ser. No. 836,707
Int. Cl.[4] B23Q *3/157*; B23B *31/10*
U.S. Cl. 29—568 2 Claims



1. Indexing apparatus enabling the use of a high speed automatic reversing tapping head having a fixed horizontal tie rod with a numerical control vertical milling maching having an associated movable tool rack with a plurality of preassigned tool storage positions, said indexing apparatus providing alignment for the automatic insertion and removal of cutting tools in the movable tool rack and in the rotatable spindle of the milling machine, said apparatus comprising:

a first member attached to a non-rotating, vertically movable location on the milling machine, said first member having secured thereto a vertical dependent shaft positioned adjacent the rotatable spindle of said machine;

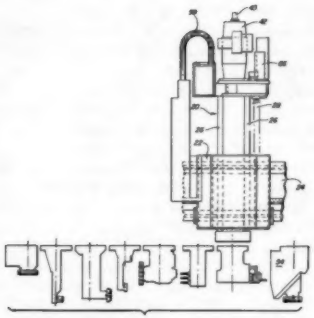
a second membr attached to the housing of the high speed tapping head, said second member including coupling means for engaging said vertical dependent shaft to thereby lock the housing of said tapping head against rotation; and

a third member attached to the movable tool rack at the assigned storage position of said tapping head, said third member having a tool holder engagable with said tapping head housing and a dependent fork for engaging the tapping head tie rod for preventing rotation of said housing upon receipt of said tapping head by said tool rack.

4,709,465
INTERCHANGEABLE SPINDLE-HEAD MILLING SYSTEM

Henry W. Lewis, and Jan Van Roojen, both of Rockford, Ill., assignors to The Ingersoll Milling Machine Company, Rockford, Ill.

Filed Oct. 4, 1985, Ser. No. 784,723
Int. Cl.[4] B23Q *3/157, 3/12*
U.S. Cl. 29—568 6 Claims



1. In a milling machine having multiple axes of linear and rotational relative movement,

a master milling head and a tool-spindle unit detachably connected to the master head,

said master head comprising an elongated ram adapted to be mounted in a machine saddle having two axes of orthogonal relative linear movement,

said ram being linearly movable in the saddle axially of the ram and perpendicularly to the plane of said two axes,

a drum journaled for rotation in the ram on the longitudinal axis of the ram and having at one end thereof a drumhead with a coupling face connected to the coupling face of said tool-spindle unit,

a driveshaft journaled in said drum coaxially thereof and coupled to a drive motor remote from the coupling face of the drumhead,

said driveshaft having coupling means at the coupling face of the drumhead for coupling the driveshaft to the tool-spindle unit,

input coupling means on the tool-spindle unit complementary to and drivingly engaged with the coupling means of said driveshaft,

a plurality of releasable grippers disposed about the coupling face of the drumhead,

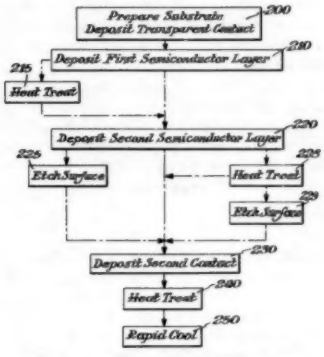
a plurality of complementary gripper-engageable retention knobs at the coupling face of the tool spindle unit secured in the grasp of said grippers, and

a positioning motor mounted on said ram and connected to rotate said drumhead and detachably connected tool-spindle unit.

4,709,466
PROCESS FOR FABRICATING THIN FILM PHOTOVOLTAIC SOLAR CELLS

Brian E. McCandless, and Robert W. Birkmire, both of Newark, Del., assignors to The University of Delaware, Newark, Del.

Filed Apr. 15, 1985, Ser. No. 723,054
Int. Cl.[4] H01L *31/18*
U.S. Cl. 437—5 10 Claims



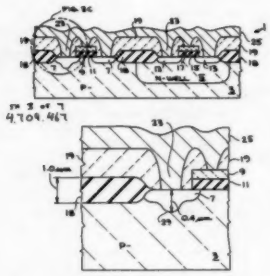
1. In a method of fabricating thin film photovoltaic solar cells made by sequentially forming a first contact layer on a substrate, a first semiconductor layer, and a second semiconductor layer, and a second contact layer, wherein at least one of the contact layers is transparent and at least one of the semiconductor layers comprises a tellurium containing II–VI compound the improvement being the steps of heat treating the cell after the second contact layer has been formed, and then rapidly cooling the cell at a temperature reduction rate of at least 10° C. per second.

4,709,467

NON-SELECTIVE IMPLANTATION PROCESS FOR FORMING CONTACT REGIONS IN INTEGRATED CIRCUITS

Yow-Juang (Bill) Liu, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 13, 1986, Ser. No. 839,756
Int. Cl.[4] H01L *21/265, 21/28*
U.S. Cl. 437—30 **7 Claims**



1. In a process for fabricating an integrated circuit in a substrate containing both PMOS and NMOS devices, wherein process steps have been completed for forming in said substrate n-doped source and drain regions and p-doped source and drain regions, wherein the source and drain regions of one of said conductivity types is shallower than the source and drain regions of the opposite conductivity type, and wherein the process steps for forming electrical contacts to said source and drain regions have been completed up to the opening of contacts to said regions through an overlying insulating layer, a method for deepening the shallower source and drain regions of said one conductivity type to inhibit spiking of a subsequently formed metal contact thereon through said regions which comprises:

introducing impurities of said one conductivity type into said substrate through said contact openings in said insulation layer in a dosage having a range sufficiently high to deepen said shallow source and drain regions of said one conductivity type yet not high enough to lower the breakdown voltage of the source and drain regions of said opposite conductivity type, whereby spiking from a subsequently formed metal contact through said initially shallow source and drain regions is inhibited without lowering the breakdown voltage of said source and drain regions of the opposite conductivity type without the need for masking the source and drain regions of said opposite conductivity type during said introduction of impurities.

4,709,468

METHOD FOR PRODUCING AN INTEGRATED CIRCUIT PRODUCT HAVING A POLYIMIDE FILM INTERCONNECTION STRUCTURE

Arthur M. Wilson, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 31, 1986, Ser. No. 824,403
Int. Cl.[4] H01L *21/28, 21/283*
U.S. Cl. 437—209 **18 Claims**

7. A method for making an integrated circuit having a flexible interconnection film attached thereto, comprising:

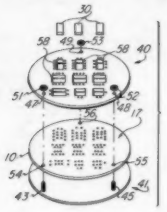
providing a substrate,

casting a polyimide/conductor multilevel film on said substrate,

providing a template having holes adapted to receive an integrated circuit in alignment with corresponding locations on said substrate,

providing means for maintaining an alignment between said substrate, template, and integrated circuit,

affixing said integrated circuit to said film,



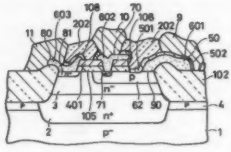
and removing said film and integrated circuit from said substrate.

4,709,469

METHOD OF MAKING A BIPOLAR TRANSISTOR WITH POLYCRYSTALLINE CONTACTS

Tadashi Hirao, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 698,523, Feb. 5, 1985, Pat. No. 4,665,424.
This application Dec. 11, 1986, Ser. No. 940,607
Claims priority, application Japan, Mar. 30, 1984, 59-64577; Jun. 14, 1984, 59-124146; Aug. 30, 1984, 59-183005
Int. Cl.[4] H01L *21/28*
U.S. Cl. 437—63 **3 Claims**



1. A method of manufacturing a semiconductor device comprising:

a first step of forming a semiconductor layer (**3**) of a first conductivity type enclosed by an isolation oxide film (**102**);

a second step of forming a base region (**62**) of a second conductivity type partially on the surface of said first conductivity type semiconductor layer;

a third step of forming a first silicon film (**601**) in a region from a part of said base region to said isolation region being in contact with said base region;

a fourth step of forming a silicon oxide film (**401**) on the surface of said semiconductor layer including said base region and said isolation region;

a fifth step of selectively etching said silicon oxide film for removing said silicon oxide film from a portion for forming a collector electrode extracting region (**81**) and a portion for forming an emitter region (**71**);

a sixth step of forming a second silicon film (**602**) and then selectively removing said second silicon film employing a mask covering said emitter region and said collector electrode extracting region;

a seventh step of selectively removing said oxide film on said base layer and a part of said second silicon film;

an eighth step of forming a thick oxide film (**108**) on said silicon film on at least said emitter layer into which highly concentrated impurities of said first conductive type are introduced and an insulating film consisting of a thin oxide film (**107**) on said base electrode forming portion exposed

in said seventh step by oxidzation at a relatively low temperature;

a ninth step of forming a metal silicide film (501) on a electrode extracting region on and said insulating film on said base layer; and

a tenth step of forming a protection film on said isolation region and regions enclosed by said isolation region and passed through respective said steps for forming a base electrode (9) on said first silicon film, an emitter electrode (10) above said emitter region and a collector electrode (11) above said collector electrode extracting region respectively through holes defined in said protection film.

4,709,470

METHOD AND APPARATUS FOR FABRICATING A CURVED MAGNET COIL

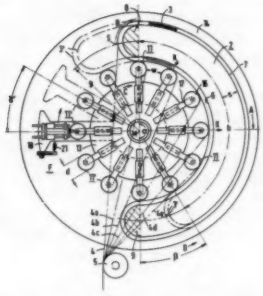
Konrad Meier, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 17, 1986, Ser. No. 820,205

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1985, 3504211

Int. Cl.⁴ H01F *41/06*

U.S. Cl. 29—605 **11 Claims**



1. A method for fabricating a curved disc-shaped magnet coil, the conductor of which is wound around a coil form having a convex side and a concave side with a therefore partly negative curvature, comprising the steps of utilizing means for winding and simultaneously pressing the conductor onto the concave side of the coil form or onto conductor turns already put in place on said concave side, and fixing the conductor in position after the winding process is complete, and further comprising the step of winding said conductor on the coil form or the conductor turns already present in the region of the convex side under tension, said step of utilizing comprising winding in the region of the concave side with relatively reduced tension with a plurality of pressure exerting means which can be moved along said concave side, said pressure exerting means being spaced substantially regularly and exerting a predetermined radial pressure, said pressure exerting means being held in position until said conductor is fixed in position on said coil form by at least one of mechanically, pneumatically or hydraulically operating means.

4,709,471

METHOD OF MAKING A MAGNETIC CORE

Milan D. Valencic, Athens, Ga., and Dennis A. Schaffer, Dallas, N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 15, 1986, Ser. No. 896,781

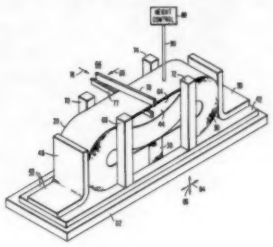
Int. Cl.⁴ H01F *41/06*

U.S. Cl. 29—605 **33 Claims**

1. A method of constructing a jointed magnetic core from amorphous metal, comprising the steps of:

winding a strip of amorphous metal to form a closed loop having a plurality of lamination turns disposed about an opening,

positioning said closed loop on a support surface in an orientation which allows the inherent flexibility of amorphous metal to collapse the loop opening and form a concave loop in an unsupported portion of the closed loop,



raising at least one of the lamination turns away from the concave loop to provide a clearance between the at least one raised lamination turn and the remaining portion of the the concave loop,

cutting said at least one raised lamination turn,

and repeating the raising and cutting steps until all of the lamination turns have been cut.

4,709,472

METHOD OF MANUFACTURING SPIRAL ELECTRODE ASSEMBLY

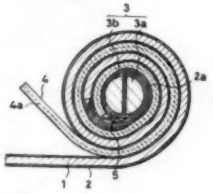
Toyoji Machida, and Shyuichi Ueno, both of Hyogo, Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 17, 1986, Ser. No. 943,650

Claims priority, application Japan, Dec. 23, 1985, 60-289807

Int. Cl.⁴ H01M *4/00, 6/00, 6/10*

U.S. Cl. 29—623 **8 Claims**



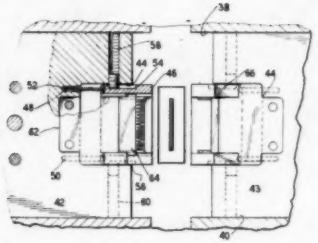
1. A method of manufacturing a spiral electrode assembly formed by winding a first electrode member of one polarity and a second electrode member of opposite polarity separated by a separator around a spool, said method comprising the steps of covering at least both surfaces of the first electrode member with the separator, extending said separator forward beyond the leading end of said first electrode member to form a separator extension, inserting and holding the leading end of said separator extension in a slot of a spool, winding said separator extension around said spool until said separator extension is wound around said spool by a length more than the length of the circumference of said spool, inserting the second electrode member between the turns of said separator extension in such a relation that the leading end of said first electrode member is located rear relative to the leading end of said second electrode member, rotating said spool to wind said first and second electrode members separated by said separator around said spool, and withdrawing said spool.

4,709,473

DISAPPEARING SHELF ASSEMBLY FOR USE IN AN ELECTRICAL CONNECTOR APPLYING MACHINE

Charles E. Shields, 655 Woodland, Crystal Lake, Ill. 60014

Filed Jul. 17, 1986, Ser. No. 886,375
Int. Cl.[4] H01R *43/04*
U.S. Cl. 29—749 **8 Claims**



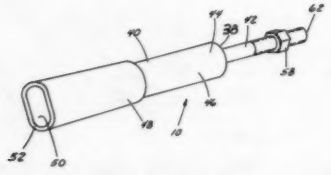
1. A machine for applying an electrical connector to a cable which includes, means for supplying a cable to which a connector is to be applied, means for supplying connector sections, means for receiving connector sections from the supply means and for applying connector sections to a cable, which includes tooling means for receiving a connector section and means for advancing said tooling means toward said cable and retracting said tooling means therefrom; wherein the improvement comprises said tooling means including shelf-like means carried thereon and constructed for movement relative to said tooling means between an extended connector-section receiving position and a retracted connector-section staking position, and there being provided biasing means associated with the tooling means and shelf-like means for urging said shelf-like means toward said extended position.

4,709,474

TRACTOR DUAL WHEEL REMOVER

Bruce M. Eckert, 6526 Highway 38, Franksville, Wis. 53126

Filed Dec. 12, 1986, Ser. No. 940,936
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—802 **12 Claims**



1. A tractor dual wheel assembly with breakaway means, comprising:

a main wheel with eyelets affixed thereto and a rim;

a dual wheel having a dual wheel rim extension in telescoping coaxial frictional engagement with the main-wheel rim and having tabs affixed thereto each with an aperture aligned with one of said eyelets in a substantially axially parallel direction such that there are corresponding pairs of tabs and eyelets;

a rigid elongate member having a main-wheel end portion non-rotatably receiving one of said eyelets and an opposite dual-wheel end portion forming a threaded shaft extending through the aperture of the corresponding tab, said threaded shaft being both axially and non-rotatably affixed with respect to the main-wheel end portion; and

nut means threadedly adjustably engaged with the shaft in position between the corresponding eyelet and tab, said nut means having an outer surface engaged with the tab about its aperture,

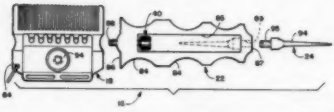
whereby rotation of the nut means easily and quickly causes breakage of the frictional engagement for removal of the dual wheel.

4,709,475

COMBINATION COMB, HAIR TRIMMER AND SAFETY RAZOR

Ha T. Phung, 3802 Granada Ave., San Diego, Calif. 92104

Filed Sep. 11, 1986, Ser. No. 906,020
Int. Cl.[4] B26B *19/00*
U.S. Cl. 30—31 **12 Claims**



1. A combination comb, hair trimmer and safety razor comprising:

a body member having a top surface, a bottom surface, a front edge, a rear edge, and laterally spaced side edges;

a plurality of comb teeth are formed on said body member along its front edge;

a substantially rectangularly shaped recess is formed in the top surface of said body member, said recess having a front edge, a rear edge, and laterally spaced side edges, the front edge of said recess coinciding with the front edge of said body member;

a cover plate having a substantially rectangular shape having a top surface, a bottom surface, a front edge, a rear edge, and laterally spaced side edges, said cover plate being detachably received in the substantially rectangularly shaped recess formed in the top surface of said body member;

said cover plate having a plurality of fingers formed along its front edge, said fingers on said cover plate having downwardly extending finger tips; and

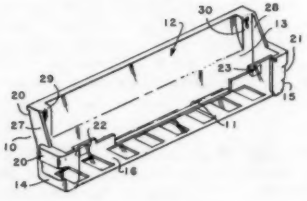
means for detachably securing said cover plate to said body member.

4,709,476

SAFETY RAZOR SYSTEM

Jill M. Shurtleff, South Boston, and Alejandro C. Lee, Cambridge, both of Mass., assignors to The Gillette Company, Boston, Mass.

Filed Oct. 8, 1986, Ser. No. 916,765
Int. Cl.[4] B26B *21/44*
U.S. Cl. 30—41 **6 Claims**



1. A safety razor system comprising:

a razor blade assembly having a predetermined width made up of a cartridge having a guard member and a blade means, said blade means being permanently mounted between a platform and a cap, said cap including a water-activated shaving aid disposed on a surface of said cap

behind said blade means, said shaving aid expanding with respect to said surface of said cap, when wet; and

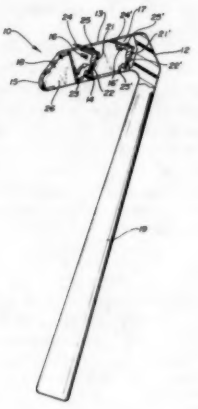
a one-piece, integrally molded overcap having a chamber, said chamber having a transverse dimension substantially that of the width of the razor blade assembly and extending in height to cover said guard member and said blade means, said chamber including a substantially planar top wall and a bottom wall laterally displaced from said top wall, first and second end walls connecting said top wall to said bottom wall for preventing movement of said razor blade assembly into or out of said chamber in a transverse direction, and a hood member integrally connected to said top wall, said hood member extending over the entire surface of said shaving aid and exiting upward from the planar surface of said top wall and directed away from said chamber such that said shaving aid, when expanded, has sufficient clearance to prevent contact between said expanded shaving aid and said hood member.

4,709,477

BLADE ASSEMBLY FEATURING VARIABLE SPAN

Frank A. Ferraro, Trumbull, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Sep. 2, 1986, Ser. No. 902,715
Int. Cl.[4] B26B *21/22*
U.S. Cl. 30—50 **7 Claims**



1. A blade assembly comprising in combination:

(a) a frame with an essentially flat bottom portion, a front portion and a back portion both portions extending upward from said bottom portion, a hollow central portion defined at either side by inner faces of said front and back portion, said front portion including a guard bar formed on the top of said portion;

(b) a first blade support mounted on said bottom portion and extending upward to support a first blade, said blade support including pivoting means which allows pivotal movement of the first blade along a predetermined arcuate path to change the span of said first blade in response to pressures exerted during shaving; and

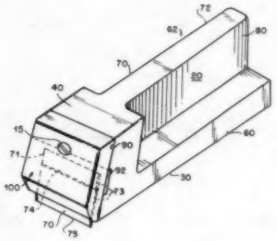
(c) a second blade support mounted on said bottom portion and extending upward to support a second blade, said blade support including pivoting means which allows pivotal movement of the second blade along a predetermined arcuate path to change the span of said second blade independent of the change in span of said first blade.

4,709,478

WINDOW PAINT SCRAPER

David H. Cortelyou, Jr., 95 Franklin Ave., Staten Island, N.Y. 10301

Filed Oct. 2, 1986, Ser. No. 914,670
Int. Cl.[4] B26B *3/00*
U.S. Cl. 30—169 **7 Claims**



1. A window paint scraper for removing paint from a windowpane comprising:

an elongated one-piece scraper body having a flat bottom surface and left and right parallel, vertical sidewalls, each of which comprises a guide wall for a user in operation of the scraper, said left and right guide walls extending continuously from front to rear of the scraper body for permitting one of said guide walls to engage and rest on a windowpane in alignment with and alongside the edge of a putty line which extends along the windowpane and is coated with paint which extends beyond the putty line and over the windowpane;

said scraper body having a handle which is integral with said one-piece body;

said scraper body having a flat bottom surface which, due to the use of said guide wall, is adapted to glide over said windowpane and over excess paint thereon immediately adjacent said putty line or sash;

said scraper body having a front surface disposed at an angle relative to said bottom surface;

a razor blade mounted on said front surface of said scraper body at said angle; the two side edges of said blade being spaced inwardly from said respective left and right guide walls, the cutting edge of said blade extending slightly below said bottom surface of said scraper body at the forward edge thereof so that said cutting edge of said blade removes excess paint from beyond said putty line from said windowpane as it is moved along the windowpane and so that the edges of said guide walls are raised above the surface of said windowpane so that the bottom surfaces of said left and right guide walls are raised slightly above the surface of the windowpane and can glide over the excess paint adjacent to the putty on said windowpane;

a blade-retaining cover for said razor blade on the front surface of said scraper body and removably secured thereto, whereby a razor blade can be seated on or removed from said front surface; and

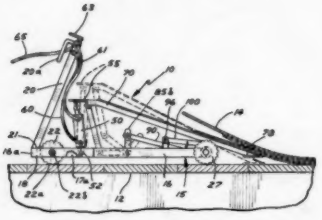
means for removably attaching said razor blade and cover to said front surface of said scraper body;

and including a compartment extending from said front surface into said body at about a 45 degree angle and operable as a storage chamber for receiving extra razor blades, said chamber being covered by said cover when said cover is in place in said front surface.

4,709,479
SHINGLE REMOVING MACHINE

William J. Lavelette, 3137 South Superior St., Milwaukee, Wis. 53207

Filed Sep. 22, 1986, Ser. No. 910,061
Int. Cl.[4] E04D *15/00*
U.S. Cl. 30—170 4 Claims

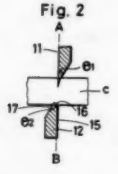


1. A shingle removing machine having in combination
a frame having a rear wheel support and a plurality of spaced front wheels,
a shaft having said front wheels mounted thereon,
sleeves carried on said shaft between said wheels,
a power actuated cylinder having a vertically movable piston,
a plate member carried at the top of and operated by said piston,
a plurality of operating members diverging forwardly from said plate member,
each of said operating members extending over and being secured to a respective of said sleeves and having terminal portions extending beyond said sleeves,
a blade member extending across and being secured to said terminal portions,
a driving gear on said shaft,
means connecting said plate member and said gear engaging and driving said gear,
whereby a movement of said plate member causes said blade to move downwardly underlying adjacent facing shingles and a second movement of said plate member causes a forward movement and a lifting action of said blade which causes said shingles to come free of the underlying roof boards, and
a handle upstanding at the rear of said frame.

4,709,480
SCISSORS

Shigetsugu Takigawa, and Masuhiko Takigawa, both of Osaka, Japan, assignors to ARS Edge Co. Ltd., Osaka, Japan

Filed Feb. 13, 1986, Ser. No. 828,913
Claims priority, application Japan, Apr. 2, 1985, 60-49723[U]
Int. Cl.[4] B26B *13/10*
U.S. Cl. 30—254 1 Claim

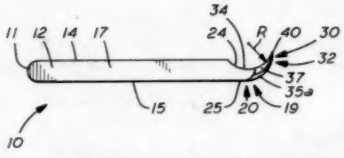


1. Scissors, comprising:
a first blade made of a metal and having a cutting edge formed by a flat side and beveled side intersecting at an acute included angle;
a second blade having a flat side adapted to rub against said flat side of said first blade when said first blade and said second blade meet;
said second blade further having an adjacent side to said flat side such that said adjacent side and said flat side form an obtuse included angle;
said second blade further having a beveled side intersecting said adjacent side at an angle and thereby forming a non-jagged sharp line cutting edge portion, at least said cutting edge portion being made of a ceramic; and
a pivot for permitting the pivotal movement of said first blade and said second blade when handles at their ends are brought together or moved away from each other.

4,709,481
SHAVING TOOL

Milton D. Moore, 2940 Holly Hall, Houston, Tex. 77054

Filed Aug. 19, 1986, Ser. No. 897,871
Int. Cl.[4] B26B *9/02*
U.S. Cl. 30—356 16 Claims

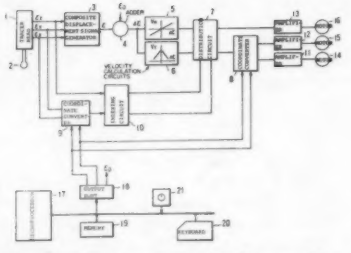


1. An instrument for use in extricating ingrown hairs from skin tissues, comprising:
a handle;
a curved extension attached to said handle, said curved extension having a proximal portion and a distal portion, said distal portion comprising a tapered blade terminating in a sharp point, said tapered blade having a noncutting upper surface adapted for lifting but not cutting the ingrown hairs, said tapered blade further comprising an upper concave surface having radius R, two lower convex surfaces, and two upper side surfaces, all of said surfaces intersecting at said point.

4,709,482
ARBITRARY-DIRECTION TRACER CONTROL UNIT

Hitoshi Matsuura, Hachioji, and Hiroshi Sakurai, Hino, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP85/00414, § 371 Date Mar. 21, 1986, § 102(e) Date Mar. 21, 1986, PCT Pub. No. WO86/00845, PCT Pub. Date Feb. 13, 1986
PCT Filed Jul. 22, 1985, Ser. No. 855,627
Claims priority, application Japan, Jul. 27, 1984, 59-157006
Int. Cl.[4] G01B *7/28*
U.S. Cl. 33—1 M 1 Claim



1. An arbitrary-direction tracer control unit, comprising:
a tracer head for outputting a displacement signal corre-

sponding to the displacement of a stylus in contact with a surface of a mode;

a memory for storing an angle between an X-axis and a tracer feed axis;

correction angle setting means for setting a fixed value correction angle with respect to the tracer feed axis;

adder means for adding together the angle stored in said memory and the correction angle set by said correction angle setting means and producing an output; and

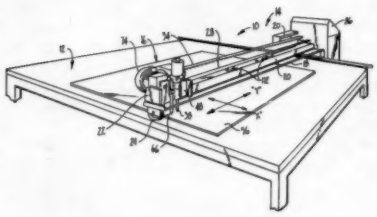
tracing operation means for operating, on the basis of the added output of said adder means and the displacement signal from said tracer head, at a feed rate in each axis direction at which the model and the stylus are moved relative to each other in a direction corresponding to the added result output by said adder means.

4,709,483

GLASS CUTTING DEVICE

Charles B. Hembree, El Cerrito, and Brian T. Shea, Berkeley, both of Calif., assignors to Wing Aero, El Cerrito, Calif.

Filed Mar. 14, 1984, Ser. No. 589,583
Int. Cl.[4] C03B *33/04*
U.S. Cl. 33—18.1 **6 Claims**
MICROFICHE APPENDIX INCLUDED
(1 Microfiche, 52 Pages)



1. A method of operating a driven glass cutting head mounted on a glass cutting platform with the aid of a computer, comprising the steps of:

a. providing the computer with a data base for the motor driven glass cutting head, including at least;
a list of dimensions of desired pieces of glass
a list of dimensions of pieces of glass in stock and
a list of dimensions of desired waste pieces of glass;

b. repetitively comparing in the computer the dimensions of one piece of glass of said list of desired pieces of glass with said dimensions of said list of pieces of glass in stock and determining the smallest one stock piece of glass therefrom which will fit said one desired piece of glass with at least one remainder piece of glass;

c. determining in the computer the orientation of and cutting start and end points for the pattern of said one desired piece of glass in relation to said determined one stock piece of glass to produce a remainder piece of glass having a maximum area;

d. adding in the computer the dimensions of said at least one remainder piece of glass to said list of dimensions of pieces of glass in stock to form a combined list of pieces of glass;

e. repetitively comparing in the computer the dimensions at least another piece of glass of said list of desired pieces of glass to said combined list of pieces of glass and determining at least another smallest piece of glass therefrom which will fit said another desired piece of glass;

f. determining in the computer the orientation of and the cutting start and end points for the pattern of said at least another desired piece of glass in relation to the determined at least another piece of glass from said combined list to produce at least another remainder piece of glass having a maximum area;

g. repetitively comparing in the computer the dimensions of at least one desired waste piece of glass from said list of desired waste pieces of glass to at least a plurality of remainder pieces of glass and determining the smallest of said plurality of said remainder pieces of glass which will fit said at least one desired waste piece of glass;

h. determining in the computer the orientation of and the cutting start and end points for the pattern of said at least one desired waste piece of glass on said determined remainder piece of glass;

i. positioning said determining one stock of glass on the glass on the glass cutting platform;

j. signalling from the computer to the cutting head said cutting start and end points for the pattern of said one desired piece of glass;

k. cutting said one desired piece of glass from said determined one stock piece of glass according to said one desired piece signal;

l. positioning said determined at least another piece of glass from said combined list on the cutting table;

m. signalling from the computer to the cutting head said cutting start and end points for the pattern of said at least another desired piece of glass; and

n. cutting said at least another desired piece of glass from said determined at least another piece of glass from said combined list according to said another desired piece signal;

o. positioning said determined remainder piece of glass on the glass cutting platform;

p. signalling from the computer to the cutting head said cutting start and end points for said desired waste piece; and

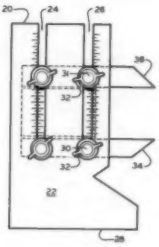
q. cutting said desired waste piece of glass from said determined remainder piece of glass according to said desired waste piece signal.

4,709,484

LEVER DISPLACEMENT GAUGE

Daniel E. Bishop, East Corinth, Me., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 29, 1986, Ser. No. 913,791
Int. Cl.[4] G01B *5/08*
U.S. Cl. 33—169 R **1 Claim**



1. A displacement gauge particularly suited for rigging collective pitch levers of helicopters comprising an aligning plate having parallel slots therein perpendicular to the base thereof, an indexing strip, a registering strip, two pins holding the indexing strip against the aligning plate parallel to the base of the aligning plate, one pin passing through each slot in the aligning plate and then through the indexing strip so that the indexing strip is slidable up and down against the aligning plate, two pins holding the registering strip against the aligning plate parallel to the aligning plate base, one pin passing through each slot in the aligning plate and through the registering strip so that the registering strip is slidable against the aligning plate, a spacer panel so disposed between the indexing strip and the registering strip as to be carried thereby so that when the indexing strip is moved to a set position the register-

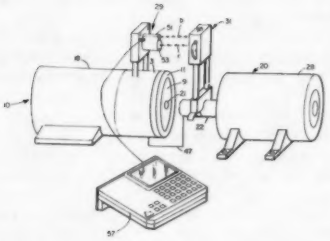
ing strip is moved therewith by the spacer panel therebetween to maintain the predetermined distance between them, and lock nuts affixed to the pins for securing the indexing and registering strips in the set position, the indexing strip and the registering strip being provided with tongues along the facing sides thereof, and the spacer being provided with grooves on its sides adjacent the tongues to be held thereby between the indexing and registering strips.

4,709,485

SHAFT ALIGNMENT METHOD AND APPARATUS

Donald E. Bowman, Joliet, Ill., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 4, 1986, Ser. No. 937,808
Int. Cl.[4] G01B *5/25, 7/31*
U.S. Cl. 33—228 **19 Claims**



1. An apparatus for use in alignment of respective shafts of two items of equipment along a common center line, comprising:

(a) a cylindrical alignment housing including means for mounting it on a housing of one of said items of equipment in substantially concentric relation to the shaft of the equipment item,

(b) a cylindrical bearing housing substantially concentrically disposed around said alignment housing and rotatably supported thereon, and

(c) measuring means supported on said bearing housing and a said shaft of the other item of equipment for determining whether said shafts are aligned with each other.

4,709,486

METHOD OF DETERMINING THE ORIENTATION OF A SURVEYING INSTRUMENT IN A BOREHOLE

Philip H. Walters, Austin, Tex., assignor to Tensor, Inc., Round Rock, Tex.

Filed May 6, 1986, Ser. No. 860,020
Int. Cl.[4] F21B *47/22*
U.S. Cl. 33—304 **15 Claims**

1. A method of determining the orientation of a surveying instrument in a borehole comprising:

measuring the radial components of the earth's magnetic field at a plurality of orientations of a surveying instrument in a borehole;

measuring the earth's gravitational field at a plurality of orientations of a surveying instrument in a borehole;

calculating the borehole axial magnetic component at each said orientation from said gravitational and the radial magnetic field measurements; and

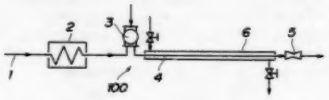
computing the azimuth angle of each said orientation directly from said gravitational and radial magnetic field measurements and the calculated borehole axial magnetic component.

4,709,487

METHOD FOR PROCESSING BY HEATING AND EQUIPMENT FOR SAME

Takeshi Akao, and Toshio Furukawa, both of Chiba, Japan, assignors to Kikkoman Corporation, Chiba, Japan

Filed Feb. 28, 1986, Ser. No. 834,928
Claims priority, application Japan, Feb. 28, 1985, 60-39698
Int. Cl.[4] F26B *3/10*
U.S. Cl. 34—10 **17 Claims**



1. A method for processing by heating a powder-like and or granular substance, comprising:

charging said powder-like and/or granular substance as a matter to be processed into a heated and pressurized medium stream adapted for directly heating;

heating said powder-like and/or granular substance while transferring said powder-like and/or granular substance in a heating tube (4, 6, 9) by said direct-heating medium stream;

discharging from said heating tube said powder-like and/or granular substance as it is heated to be processed by said direct-heating medium stream;

selectively varying the pressure of the medium stream within the tube by selectively restricting the discharge of the medium stream from the tube; and

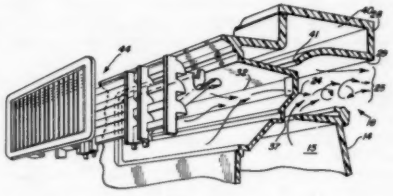
whirling said direct-heating medium stream in said heating tube (4) to spirally transfer said powder-like and/or granular substance.

4,709,488

VENTURI AIR VENT FOR DISHWASHER

Jeffrey Anselmino, Pipestone Township, Berrien County, and Scott D. Slabbekoorn, St. Joseph Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Aug. 6, 1986, Ser. No. 893,942
Int. Cl.[4] F26B *25/12*
U.S. Cl. 34—235 **16 Claims**



1. In an apparatus having means defining a drying chamber, means defining an outlet in communication with said drying chamber, means for effecting flow of air into and through the drying chamber to absorb moisture therein and flow of the air outwardly from the drying chamber through said outlet as a stream of moist air, and a wall member adjacent said drying chamber and having a dry air flow passage extending therethrough, the improvement comprising:

venturi means with a converging inlet portion and a diverging outlet portion to develop a low pressure suction zone, said air with absorbed moisture from the drying chamber

flowing from the drying chamber through said venturi means to said outlet;

first means for delivering air from said dry air flow passageway as an incident of a pressure differential between the dry air flow passageway and suction zone to said suction zone for mixture with the air with absorbed moisture in the venturi means; and

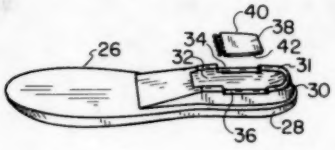
second means separate from said first means for delivering air from said dry air flow passage to said low pressure suction zone against said moist air stream as a layer juxtaposed to a surface portion of said moist air stream as an incident of a pressure differential between the air flow passage and the suction zone, whereby said layer acts as a barrier preventing undesired delivery of said moist air to outwardly of said barrier.

4,709,489

SHOCK ABSORBING ASSEMBLY FOR AN ATHLETIC SHOE

Kenneth F. Welter, 889 Heritage Dr., Addison, Ill. 60101

Filed Aug. 15, 1985, Ser. No. 765,845
Int. Cl.[4] A43B *21/30*
U.S. Cl. 36—27 **14 Claims**



1. A shock absorbing assembly for an athletic shoe comprising:

a resiliently flexible plate in the form of a beam having a front laterally extending marginal edge portion and laterally spaced opposite end portions, the plate being of a size between the end portions to support the heel of a person wearing the shoe and being of a thickness to be arcuately downwardly deflected by pressure applied by said person upon the plate;

a heel portion positioned within the shoe and provided with a pair of laterally spaced supports, each of said supports being relatively non-compressible, each of the plate end portions bearing upon one of said supports and said front marginal edge portion being unsupported and free to flex intermediate the supports;

means for retaining each of said plate end portions on its respective support; and

means intermediate the spaced supports to permit downward deflection of the plate between said supports by the weight of the person wearing the shoe whereby application of downward pressure on the heel portion by a person wearing the shoe downwardly deflects the resilient plate to form a longitudinally trough to longitudinally cradle the heel of said person.

4,709,490

INSOLE

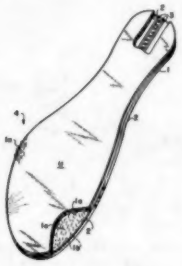
Walter Föttinger, Weinheim, and Kurt Jörder, Weinheim-Heiligkreuz, both of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed May 27, 1986, Ser. No. 867,482
Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520093
Int. Cl.[4] A43B *13/38*
U.S. Cl. 36—44 **8 Claims**

1. A two layer insole including a moisture-storing layer and a capillarily-conductive layer, having a total thickness from about 1.5 to about 5 mm and a weight from about 200 g/m^2 to about 1200 g/m^2,

said moisture-storing layer constituting not less than about 60 and not more than about 95 weight percent of the total weight per square meter, and comprising absorbent fibers,

said capillarily-conductive layer consisting of hydrophobic fibers superimposed on the moisture-storing layer and



providing an opposite, exposed surface, the hydrophobic fibers defining pores therebetween for capillarily-conducting moisture from the exposed surface of the capillarily-conductive layer to the moisture-storing layer; and

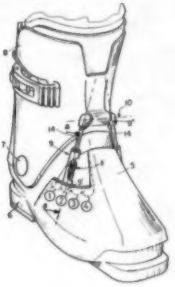
means for bonding the two layers together moisture permeably, said bonding means comprising some of the hydrophobic fibers of the capillarily-conductive layer which penetrate into the moisture-storing layer.

4,709,491

ALPINE SKI BOOT

Joseph Morell, Annecy; Jean-Louis De Marchi, Duingt, and Norbert Kopp, Chavanod, all of France, assignors to Salomon S.A., Annecy, France

Filed Jun. 2, 1986, Ser. No. 869,245
Claims priority, application France, Jun. 12, 1985, 85 09178
Int. Cl.[4] A43B *5/04*
U.S. Cl. 36—121 **54 Claims**



1. A ski boot for surrounding the foot and the lower leg of a skier, wherein said boot comprises:

(a) a shell base portion;

(b) an upper portion, wherein said upper portion is adapted to flex with respect to said shell base portion; and

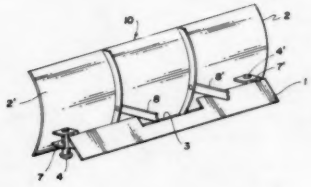
(c) an elastic apparatus for controlling the flexion of said upper portion, wherein said elastic apparatus is secured to each of said portions at a connection point, wherein said elastic apparatus generates an elastic force directed toward said connection point of said elastic apparatus with one of said portions of said boot, wherein the position of said connection point of said elastic apparatus with the other portions of said boot is adjustable to correspondingly vary the orientation of said elastic force.

4,709,492

PUSHING APPARATUS, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Gordon Watson, 12750 Apple Dr., Nunica, Mich. 49448

Filed Jul. 10, 1986, Ser. No. 884,001
Int. Cl.[4] E01H *5/04*
U.S. Cl. 37—232 **20 Claims**



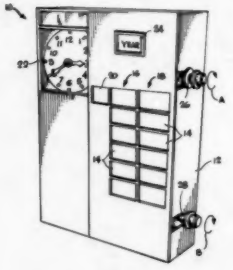
1. A pushing apparatus, comprising, in combination:
a main blade for pushing a portion of a substance when said main blade is moved in a forward direction;
a back scraper blade for pushing another portion of said substance when said main blade is moved in a rearward direction;
connecting means for operably and hingedly connecting said back scraper blade to the rear of said main blade; and
said connecting means comprising shoes disposed on the backside of said main blade and wedge brackets fitted over said shoes for hingedly holding said back scraper blade.

4,709,493

CLOCK WITH CALENDAR NOTEPAD

Charles E. Sapp, 2149 Rio Guacimal Ct., San Jose, Calif. 95116

Filed Dec. 1, 1986, Ser. No. 936,493
Int. Cl.[4] G09D *3/10*
U.S. Cl. 40—117 **3 Claims**



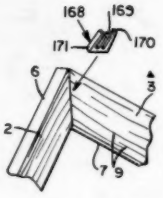
1. A clock calendar comprising,
a housing having a front side,
a plurality of windows on said front side of the housing, including a date window,
a paper roll adjustably disposed within said housing, said paper roll having a list of calendar days printed thereon,
means for positioning said paper roll within said housing such that a calendar day is readable within said date window and advancement of said paper roll causes a different day to be readable within the date window, said means for positioning the paper roll being a pair of rotatable shafts, said paper roll having a first end portion wrapped about a first rotatable shaft of said pair of rotatable shafts and having a second end portion wrapped about a second rotatable shaft, whereby rotation of said shafts causes the length of said paper roll between said end portions to move past said windows, said paper roll having blank space for the recordation of personal dates through windows other than date windows, and
a clock in communication with said paper roll, said clock having a means for periodically advancing the paper roll, said means for periodically advancing the paper roll including a plurality of radially outwardly extending projections about the circumference of said first shaft and including a bar attached to said clock for rotation with the hour hand of the clock, said bar having sufficient length to communicate with said projections for rotation of said first shaft, wherein said bar is balanced upon a shaft to which said hour hand is fixed, whereby advancing of said paper roll causes the next calendar day to be readable within said date window and said recorded personal dates are caused to be brought forward toward said window adjacent said date window.

4,709,494

PICTURE FRAME FASTENER

Gary D. Kennedy, and Joseph G. Maher, both of Atlanta, Ga., assignors to Kentec, Inc., Decatur, Ga.

Continuation of Ser. No. 169,371, Jul. 16, 1980, abandoned. This application Mar. 12, 1982, Ser. No. 357,425
Int. Cl.[4] A47G *1/06*; G09F *1/12*
U.S. Cl. 40—152 **2 Claims**



1. A frame comprising elongated wooden frame elements positioned in a common plane, each frame element having generally parallel grain extending along the length of the frame element and angled end surfaces in abutment with the angled end surfaces of adjacent frame elements and forming mitered joints about the frame, said frame having a front surface, a back surface, an outer edge surface and an inner edge surface, and fasteners at each joint of said frame, the improvement therein of said fasteners being approximately U-shaped in cross-section and including a flat central web and side flanges extending along opposite edges of the central web at angles with respect to the central web and said side flanges of each fastener straddling the joint of the abutting frame elements, with the central web of each fastener extending from the back surface and sloped from adjacent the back surface and the outer edge surface at a joint of said frame toward the front surface and the inner edge surface at the joint of said frame, whereby the joints are characterized by having been drawn together by the insertion of the side flanges of the fasteners through the previously uncut grain of the frame elements and into the joints of the frame from the back surface at an angle sloped from the outer edge surface toward the inner edge surface of the joints of the frame.

4,709,495

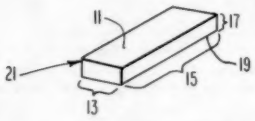
SEPARATOR MEANS FOR FRAMELIKE DEVICES

Kendrick Buckwalter, 18 Chetwynd Rd., Paoli, Pa. 19301

Filed Aug. 6, 1982, Ser. No. 406,101
Int. Cl.[4] A47G *1/06*
U.S. Cl. 40—158 R **3 Claims**

1. A means for displaying a two dimensional item comprising in combination: three dimensional frame means formed to a particular configuration in a two dimensional sense and having an outer edge and an aperture therewithin defined by an

inner edge; said three dimensional frame means being further formed to have a horizontal shelflike section which has length and width dimensions being defined by said inner edge and by a line lying between said inner edge and said outer edge; said three dimensional frame means further formed to have a vertical wall section disposed to rise vertically from said line in a third dimension to thus define a depth dimension for said horizontal shelflike section; transparent means formed to fit completely over said aperture in abutment with said horizontal shelflike section and in close proximity to said vertical wall section; a plurality of three dimensional clear separator means formed to be individual from each other and disposed to be unattached to each other, each of said three dimensional clear separator means having length, width and depth dimensions with at least one of said separators being formed so that its length dimension is less than the length of an associated part of said shelflike section and each disposed to come in abutment



with said transparent means in alignment with an associated part of said shelflike section, said three dimensional clear separator means further formed of material which does not absorb moisture and which can be readily cut to enable any of said three dimensional clear separator means to be cut to a length to approximately match an associated part of said shelflike section; pressure sensitive adhesive means disposed on a front surface of each three dimensional clear separator means, which front surface is defined by the length and width dimensions of such three dimensional clear separators to then enable each three dimensional clear separators to be pressure secured along its front surface to said transparent means and alternatively to be removed therefrom whereby, when said plurality of three dimensional clear separator means are secured to said transparent means, a two dimensional item to be displayed can be disposed to overlay said plurality three dimensional clear separator means, and can be separated from said transparent means by the depth of said three dimensional clear separator means.

4,709,496

SAFETY DEVICE INCLUDING CHAMBER PROBE

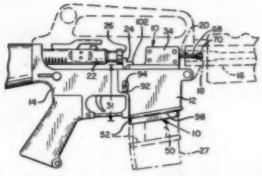
David A. Johnson, 3432 Tanglewood Way, Salem, Oreg. 97302

Filed Dec. 18, 1986, Ser. No. 943,946

The portion of the term of this patent subsequent to Oct. 28, 2003, has been disclaimed.

Int. Cl.[4] F41C *17/08*

U.S. Cl. 42—70.11 **19 Claims**



1. A safety device for use in a repeating firearm of the type having a chamber for holding a cartridge during firing, a bolt reciprocatingly movable between a closed position necessary for the firearm to be fired and an open position which prevents firing, and having a magazine well including an opening for receiving a magazine therein, the safety device comprising:

(a) a main body capable of fitting within said magazine well;

(b) movable chamber probe means associated with said main body for detecting the presence of an object in the chamber of said firearm; and

(c) movable indicator means, associated with said main body and connected with said chamber probe means, for providing a visible indication when said chamber probe means encounters an object in said chamber.

4,709,497

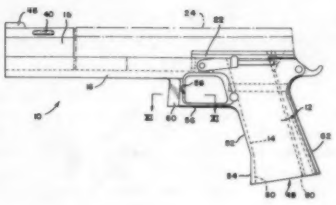
HANDGUN FRAME WITH FIXED BARREL BUSHING

Franco Resca, 117 Oak Avenue, Cullinan, Transvaal Province, South Africa

Continuation-in-part of Ser. No. 750,332, Jun. 28, 1985, abandoned. This application Feb. 25, 1987, Ser. No. 18,860

Int. Cl.[4] F41C *21/22*

U.S. Cl. 42—75.02 **6 Claims**



1. A handgun frame for receiving a barrel and slide of the type operating on the Browning short recoil principle, the frame including a magazine well defined within a grip formation, an elongated cantilever support extending forwardly from the grip formation to a position beyond a forward end of the barrel, a barrel bushing rigidly fixed to and directly mounted on a forward end of the cantilever support for slidably supporting a front end of the barrel therein, and slide support means for slidably supporting the slide.

4,709,498

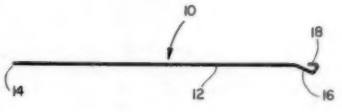
METHOD FOR MOUNTING SHRIMP

Frank Wolski, Poor Boys Fishin' Hole, P.O. Box 857, Coquille, Oreg. 97423

Filed Oct. 6, 1986, Ser. No. 915,413

Int. Cl.[4] A01K *97/00*

U.S. Cl. 43—4 **7 Claims**



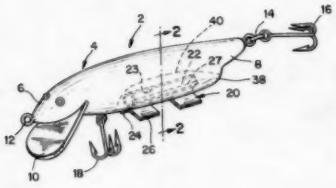
1. A method of mounting shrimp as bait on a hook located at the end of a length of fishing leader line utilizing a fishline having a free end and a threading tool formed of a rigid wire pointed at one end, having a straight shank, and defining a crook at the opposite end, comprising: forming a loop in said length of fishing leader line opposite said hook, engaging said loop on said crook of said threading tool, impaling a shrimp on said pointed end of said threading tool, passing said threading tool completely through the body of said shrimp, thereby pulling said loop therewith, drawing said leader line into said body of said shrimp until said hook reaches said body, disengaging said loop from said crook, and attaching said loop to said free end of said fishline.

4,709,499

CHEMILUMINESCENT FISHING LURE DEVICE

Gary W. Ottaviano, 24440 Uppingham, Bedford Heights, Ohio 44146

Filed Jul. 17, 1985, Ser. No. 755,809
Int. Cl.[4] A01K *85/01*
U.S. Cl. 43—17.6 **17 Claims**



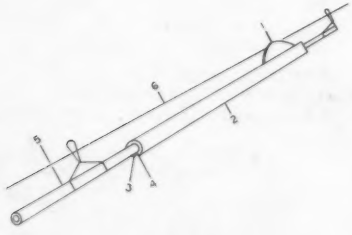
1. A fishing lure device of the type for providing a chemical attractant for attracting fish, said device including a lure body having a predetermined shape to generally simulate a fishing bait, said body having an elongated cavity formed therein and having at least one open end communicating with the exterior of said body, and an elongated member removably disposed within said cavity, said elongated member containing a chemical attractant means adapted for providing a selected chemical attractant and having at least one guide member extending outwardly from said elongated member and exteriorly of said lure body.

4,709,500

VISUAL TIP

Calvin K. Yasumiishi, 1335 NE. 175th Ave., Portland, Oreg. 97230

Filed Oct. 14, 1986, Ser. No. 918,029
Int. Cl.[4] A01K *97/12*
U.S. Cl. 43—24 **1 Claim**



1. A one piece fishing apparatus for use on a fishing rod tip for aiding in the signaling of a fish strike composed of, in combination, a flourescent polyvinyl plastic tubular staff of uniform cross section having a longitudinal seam formed by longitudinal edges mutually opposed, a flag of uniform cross section located on the distal end of the tubular staff, said flag mounted atop said tubular staff on one side opposite the longitudinal seam whereby the fishing apparatus can be quickly removed from or replaced upon the fishing rod intact.

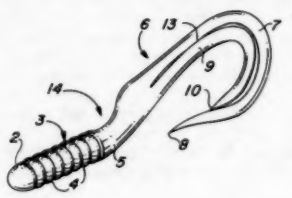
4,709,501

LURES WITH DISSIMILAR TAIL LENGTHS

Gregory C. Garst, Rte. 3, Box 478, Many, La. 71449

Filed Apr. 7, 1986, Ser. No. 848,941
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.24 **8 Claims**

1. A fishing lure comprising a body portion; at least one curved, flexible split-tail portion extending outwardly and rearwardly from a point of attachment to said body portion and curving inwardly toward said point of attachment; and a slot provided in said split-tail portion, said slot defining an outside tail segment extending substantially the entire length of said split-tail portion and defining an outside element of said split-tail portion, and an inside tail segment defining an inside element of said split-tail portion, said inside tail segment being



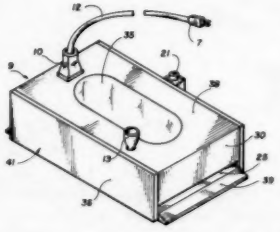
shorter than said outside tail segment, said slot separating said outside tail segment and said inside tail segment, whereby said inside tail segment and said outside tail segment are free to independently flutter with respect to each other at different frequencies in and out of a plane bisecting said outside tail segment and said inside tail segment when said lure is retrieved through a body of water.

4,709,502

ELECTRIC ROACH TRAP

Albert Bierman, 2380 Windward Cir., West Lake Village, Calif. 91361

Filed Sep. 13, 1985, Ser. No. 775,776
Int. Cl.[4] A01M *1/22*
U.S. Cl. 43—112 **5 Claims**



1. An electric roach trap comprising:
a housing comprising a top housing and a bottom housing, said housing substantially enclosing at least three spaced apart conductors, each conductor representing a different type having a structurally different shape, said conductors being spaced from each other, each said conductor having a separate electrical conducting path which is normally open, upon a roach contacting simultaneously any two of said conductors the roach will be electrocuted with the conductors being located at locations to insure that each roach entering said trap will be electrocuted.

4,709,503

CRAWLING INSECT TRAP

Robert McQueen, 2744 Shipley Ter., SE., Washington, D.C. 20020

Filed Oct. 21, 1985, Ser. No. 789,645
Int. Cl.[4] A01M *1/14*
U.S. Cl. 43—114 **21 Claims**

1. A crawling insect trap comprising:
a housing including a top, a bottom, and a side wall connecting said bottom and said top,

said side wall including at least one insect entry side wall opening through it to the interior of said housing,

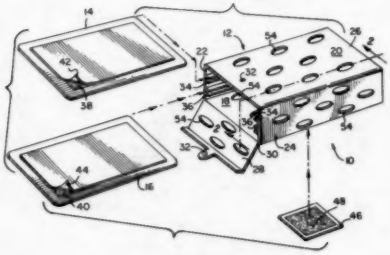
said top including at least one insect entry top opening through it to the interior of said housing,

a shelf positionable in said housing,

said shelf having a first shelf side, an opposite second shelf side and a first sticky insect-catching material on said first shelf side,

said entry side wall opening providing access for an insect from the exterior of said housing to said first sticky insect-catching material,

said shelf further including second sticky insectcatching material on said second shelf side,



said housing including a first securing means for releasably securing said shelf in said housing disposed so that said shelf can be positioned in place in said housing spaced from and between said top and said bottom and can also be removed from said housing,

said housing further including an end cover movable between an open position providing access to the interior of said housing and defining an end opening through which said shelf can pass into and out of said housing and a closed position extending generally between said top and said bottom,

said first shelf side facing said bottom when said shelf is disposed in said housing, and

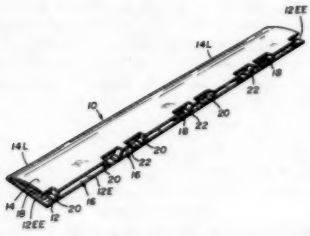
said insect entry side wall opening being positioned between said bottom and said shelf.

4,709,504

PORTABLE DISPOSABLE INSECT TRAP

Milos D. Andric, 1635 Central Ave., Wilmette, Ill. 60091

Filed Mar. 24, 1986, Ser. No. 843,137
Int. Cl.[4] A01M *1/14*
U.S. Cl. 43—114 **6 Claims**



1. A disposable crawling insect trap, comprising, in combination:

an elongated strip housing made of a unitary piece of thin, flat-sheet foldable material, having a length many times its width, said piece being folded back along its length, so as to form a roof and overlay a floor portion of itself and being provided with a number of at least three tabs cut in its surface at spaced intervals along its length, said tabs being folded inward so as to provide a plurality of spaced walls to maintain the longitudinal edges of the folded piece spaced apart a short vertical distance so as to form a substantially continuous narrow longitudinal side slit opening of a height sized to allow insects to enter into the housing between the longitudinal edges of the piece,

anti-insect material provided within the housing and extending substantially along its entire length but set back from said slit-opening so as to not readily contact the hands of a human using the trap nor other articles outside the trap; and

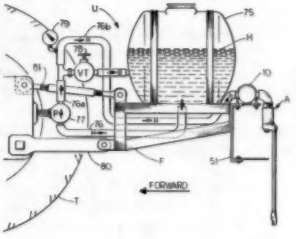
wherein said material is one of a group of pasteboard or heavy paper or plastic, and said tabs are cut from the upper folded-over roof portion of the roof-forming piece and bent downward to contact said floor portion.

4,709,505

HERBICIDE APPLICATOR APPARATUS

Bernard J. Lempa, Jr., A & M Rte., Box 66, Cuero, Tex. 77954

Filed Feb. 13, 1984, Ser. No. 579,507
Int. Cl.[4] A01G *13/00*
U.S. Cl. 47—1.7 **17 Claims**



1. Liquid herbicide spraying apparatus for mounting on a tractor to selectively detect and spray herbicide on unwanted plants including a frame for attaching said apparatus to said tractor, a tank mounted on said frame for carrying liquid herbicide, a header rotatably attached to said frame and transversely disposed with respect to the direction of travel of said tractor, means for transferring liquid herbicide from said tank to said header and maintaining pressure therein, and a plurality of moveable spray assemblies normally in a sustantially vertical position attached at spaced intervals along said header, each of said spray assemblies comprising:

valve means including a valve body, an inlet connected to said header, an outlet and a valve member movable, relative to said valve body, between a closed position and an open position;

a spray nozzle connected to said valve means outlet for directing liquid spray therefrom generally downwardly toward said unwanted plants but being mounted for at least limited omnidirectional radial movement relative to normal sustantially vertical position and

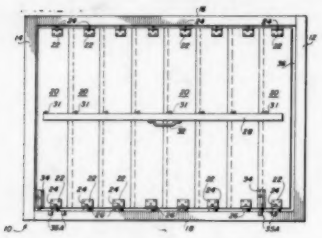
activation means operatively connected to said valve means and said spray nozzle and normally depending downwardly therefrom for temporary engagement with said unwanted plants for, upon continuing travel of said tractor, temporary displacement thereof said displacement of said activation means resulting in displacement of said valve member and said nozzle, said displacement moving said valve member to said open position and radially displacing said spray nozzle to direct said spray therefrom directly toward the area of said engagement of said activation means with said unwanted plants.

4,709,506

SWIVEL SHUTTER ASSEMBLY

William S. Lukaszonas, 7525 Old Father Rd., Tucson, Ariz. 85741

Filed Oct. 16, 1986, Ser. No. 919,631
Int. Cl.[4] E06B *7/086*
U.S. Cl. 49—88 **1 Claim**



1. A swivel shutter assembly adapted to open and close, and which presents a flat wall type appearance when closed comprising:

a framework having a lower member, a spaced apart parallel upper member, and two spaced apart parallel side members, said lower, upper, and side members forming a rectangle;

a plurality of louvers situated interiorly to said framework, each said louver having two ends, a front side, back side, opposite end sides, and a longitudinal center running centrally between each end, each said louver defining stepped portions on each of their respective end sides, each of said stepped portions adapted to be complimentary with the stepped portion of each adjacent louver when closed;

a plurality of swivel mechanisms, one of each of which operably attaching to each end of said louvers and to said framework, each said swivel mechanism including a "L"clip, one end of which attached to each end of said louvers, said other end including an opening therethrough, and further including a swivel pin adapted to reside in said opening and to be secured to each said framework upper and lower member, and further including a washer situated surrounding said swivel pin and interposed between said "L"clip and said framework upper and lower members, said swivel pin situated offset from the longitudinal center of each of said louvers and providing said louver pivotal point;

a cross bar operably attached to each louver and a handle attached to said cross bar;

a plurality of screw eyes, one of each of which attach to the back side of each louver, and one of each of which additionally attach to said cross bar, each of said screw eyes attached to said louvers interloped connected with each of said screw eyes attached to said cross bar;

a plurality of barrel lock assemblies operably attached to said louvers back side proximate said ends and said end sides, each said assembly including a slidable elongated rod, and a half collar attached to said framework lower member, said framework lower member defining a plurality of blind openings, said half collar and said blind openings adapted to receive said barrel lock assembly elongated rod to secure said louvers into a fixed open and closed position; and

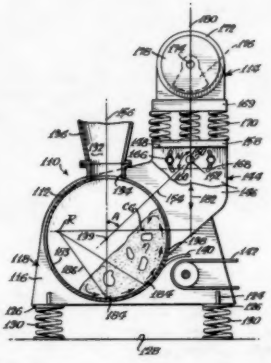
an elongated material strip attached to at least one of said framework side members to engage and limit movement of said louvers, whereby said louvers may be swiveled within said framework by grasping said handle to move said cross bar to open and close said louvers, and, to selectively secure the position of said louvers in said framework by manipulation of said barrel lock assembly elongated rod into one of the pluralities of blind openings and half collar and thereby allow a selected passage of light and wind through said framework.

4,709,507

TUMBLING APPARATUS

Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.

Continuation of Ser. No. 777,821, Sep. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 685,121, Dec. 21, 1984, abandoned. This application Oct. 22, 1986, Ser. No. 922,062
Int. Cl.[4] B24B *31/06*
U.S. Cl. 51—7 **14 Claims**



1. Vibratory apparatus comprising:

a generally hroizontally arranged container defining an inside, curved material supporting surface and having a central axis;

mounting means for resiliently mounting the container relative to a mounting surface;

a vibration generator mounted on said container;

said container having a center of gravity and having unconstrained movement relative to the mounting surface; and

means for directing the vibratory forces generated by the vibration generator along a linear path displaced from not only the central axis of the container but also from the center of gravity of the container, said linear path of vibratory forces passing on the side of the center of gravity removed from the central axis to cause points on the curved material supporting surface of the container to rotate along segments of circles.

each of said segments of said circles having a center located at a position displaced from the central axis and from said center of gravity on the other side of said central axis from said center of gravity so that the segments of the circles do not conform to the curvature of the curved material supporting surface.

4,709,508

METHOD AND APPARATUS FOR HIGH SPEED PROFILE GRINDING OF ROTATION SYMMETRICAL WORKPIECES

Erwin Junker, Talstrasse 78, 7611 Nordrach, Fed. Rep. of Germany

Continuation of Ser. No. 705,475, Feb. 26, 1985, abandoned. This application Sep. 8, 1986, Ser. No. 906,558
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1984, 3409575; Sep. 26, 1984, 3435313
Int. Cl.[4] B24B *5/00*
U.S. Cl. 51—105 R **19 Claims**

1. A method for grinding of a rotation symmetrical workpiece, comprising:

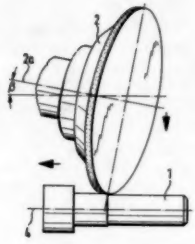
clamping in a grinding machine a workpiece having a longitudinal axis and rotating the workpiece about the longitudinal axis thereof,

providing a grinding disk having a central axis, a peripheral surface and a leading surface, said grinding disk having a hardness so that the grinding disk wears during grinding,

installing the grinding disk adjacent the workpiece so that said peripheral surface is located radially inside and axially adjacent an imaginary cylindrical surface corresponding to the outer surface of the workpiece to be ground, said peripheral surface being arranged relative to the axis of the workpiece to form a clearance angle between said peripheral surface and the surface of the workpiece that is ground, and

rotating the grinding disk about the central axis thereof and moving the grinding disk in a direction parallel to the longitudinal direction of the workpiece so that said leading surface engages the workpiece and grinds the workpiece while the grinding disk wears,

whereby said leading surface makes contact with the workpiece during grinding and the grinding disk makes only



point contact with the workpiece after grinding, independently of the wear of the grinding disk.

10. Apparatus for grinding of a rotation symmetrical workpiece, comprising

a grinding machine;

means for clamping the workpiece in the grinding machine along a longitudinal axis of the workpiece;

a grinding disk having a peripheral surface and a leading surface;

means for moving the grinding disk in a direction parallel to the longitudinal direction of the workpiece and radially setting the grinding disk in correspondence with a circumferential profile of the workpiece to be ground; and

means for mounting the grinding disk with said peripheral surface arranged with respect to the axis of the workpiece to form a clearance angle between said peripheral surface and the surface of the workpiece that is ground,

whereby said leading surface makes contact with the workpiece during grinding and the grinding disk makes only point contact with the workpiece after grinding independently of wear of the grinding disk.

4,709,509

NUMERICALLY CONTROLLED GRINDING MACHINE

Takao Yoneda, Nagoya; Tadashi Ogasawara, Toyoda; Norio Ohta, Okazaki, and Yasuji Sakakibara, Hekinan, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 17, 1986, Ser. No. 920,192

Claims priority, application Japan, Oct. 17, 1985, 60-231871

Int. Cl.[4] B24B *49/02*

U.S. Cl. 51—165.71 **4 Claims**

1. In a numerically controlled grinding machine having

a grinding wheel head capable of moving along a first axis,

a wheel spindle stock held on the grinding wheel head so as to be rotatable about its own axis within a horizontal plane,

a grinding wheel rotatably mounted on the wheel spindle stock,

a worktable capable of moving along a second axis perpendicular to the first axis, the worktable holding a workpiece in such a way that the workpiece can rotate about an axis extending parallel to the second axis,

a first register for storing data concerning the position of the cylindrical grinding surface of the grinding wheel taken on the first axis,

a second register for storing data concerning the position of the shoulder grinding surface of the grinding wheel taken on the second axis, and

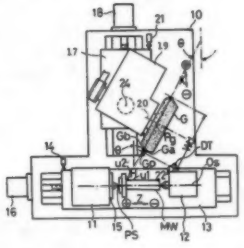
a feed control means for controlling the movement of the worktable according to the data stored in the first and second registers,

the improvement comprising:

manual feed means for moving the grinding wheel head and the worktable out of their home positions to bring the cylindrical and shoulder grinding surfaces of the grinding wheel into contact with first and second reference surfaces, respectively, of a reference member disposed on the worktable, the first and second reference surfaces being parallel to the cylindrical and shoulder grinding surfaces, respectively;

detecting means for detecting the distances traveled by the grinding wheel head and the worktable from their home positions;

a data-setting means for setting the positions of the first and second reference surfaces formed on the reference mem-



ber relative to a reference point on the worktable, the diameter of the grinding wheel, and the angle at which the grinding wheel is inclined to the first axis;

a deviation-calculating means for calculating the deviations of the cylindrical and shoulder grinding surfaces from the reference point on the wheel spindle stock as measured along the first and second axes, respectively, based on the diameter and the inclination angle of the grinding wheel which are set by the data-setting means;

a distance-calculating means for calculating the distances between the reference point on the worktable and the reference point on the grinding wheel head along the first and second axes under the condition that the grinding wheel head and the worktable are in their home positions, based on the distances which are traveled by the grinding wheel head and the worktable and are detected by the detecting means, on the positions of the first and second reference surfaces set by the data-setting means, and on the deviations detected by the deviation-calculating means;

a position-calculating means for calculating the positions of the cylindrical and shoulder grinding surfaces relative to the reference point on the worktable from the distances calculated by the distance-calculating means and from the deviations calculated by the deviation-calculating means; and

present position-setting means which are operated when the grinding wheel head and the worktable are returned to their home positions and which place the data indicating

the positions of the cylindrical and shoulder grinding surfaces into the first and second registers, the positions being calculated by the position-calculating means.

4,709,510

FLOOR SANDING AND POLISHING MACHINE

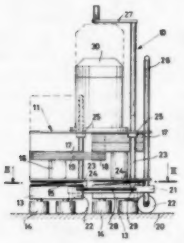
Todescato Giovanni, Via Madonna, 29 - 36045 Lonigo (Vincenza), and Conterno Giovanni, Via XXV Aprile, 3 - 36072 Chiampo (Vincenza), both of Italy

Filed Jan. 14, 1986, Ser. No. 818,765

Claims priority, application Italy, Jan. 22, 1985, 85503 A/85; Sep. 10, 1985, 22960/85[U]

Int. Cl.[4] B24B *23/02*

U.S. Cl. 51—177 **3 Claims**



1. A floor sanding and polishing machine comprising:
(a) a trolley member comprising a low platform having three spoke members disposed at approximately 120° from each other for supporting said machine on a work surface;
(b) a body member positioned above said trolley member and having an upper wall and a lower wall;
(c) a plurality of rotary heads positioned below said body and spring-mounted thereon, said rotary heads being positioned between adjacent spoke members;
(d) actuator means mounted on said body and operatively connected to said heads to cause said heads to rotate;
(e) a plurality of bolt members extending vertically upward from said trolley member through said body member;
(f) a plurality of nut means fixed to said lower walls of said body and threadably engaged with said bolt members to adjustably support said body on said trolley;
(g) a plurality of bushing means secured to said upper wall of said body, said bolt members extending through said bushing means and being guided thereby;
(h) means for synchronously rotating said bolt members comprising an actuator crank mount on one of said bolt members; sprockets on said bolt members; and a chain transmission engaging said sprockets so that said bolt members are synchronously rotated when said crank is rotated to adjust the height of said body member relative to said trolley.

4,709,511

CLAMP FOR LOCK KEY DUPLICATING MACHINE

Bianchi Camillo, Conegliano, Italy, assignor to SILCA S.p.A., Treviso, Italy

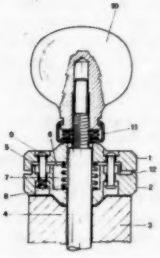
Filed Mar. 5, 1986, Ser. No. 836,425

Claims priority, application Italy, Mar. 6, 1985, 84111 A/85

Int. Cl.[4] B24B *41/06*

U.S. Cl. 51—216 R **8 Claims**

1. A clamp for lock key duplicating machines comprising
a clamp support carriage,
a theaded pin rigid with the carriage and extending therefrom,
a pair of jaws mounted upon said pin,
means for drawing the two jaws together and to clamp a key therebetween said means applying clamping force along a line of action,
elastic means interposed between the two jaws to bias them apart, and
one of said jaws having a projecting portion in a position misaligned with said line of action and offset therefrom in a direction away from the gripping faces of the jaws thereby to create a moment opposite to the reaction moment produced by the clamped key,



characterized in that the projecting portion consists of an appendix (6) provided on one jaw (2) and which is received within a corresponding recess (5) provided on the other jaw (1), the depth of the recess (5) at the corresponding faces on the side comprising the rib (12) being greater than the difference in height between the appendix (6) and the rib (12), and the depth of the recess (5) at the corresponding faces on the side not comprising the rib (12) being less than the height of the appendix (6).

4,709,512

CHUCKING DEVICE OF WORKPIECE IN GRINDING MACHINE

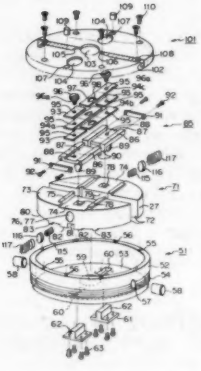
Kimio Okubo, Yuki, and Hiroshi Nemoto, Tama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 12, 1985, Ser. No. 807,950

Claims priority, application Japan, Dec. 18, 1984, 59-266851

Int. Cl.[4] B25B *5/00*

U.S. Cl. 51—237 R **15 Claims**



1. A chucking device of a workpiece to be ground in a grinding machine, comprising:
a hollow housing, having guide means, which can be rotatably connected to the grinding machine;
a pair of elastically biased weight bodies which are opposed in said hollow housing so as to come away from and close to each other along said guide means;
a pair of clamp plate assemblies, each having a longitudinal axis, provided adjacent to said weight bodies and being

slideably movable away from and towards each other along their longitudinal axis and having openings defining a center insertion opening in which the workpiece is inserted, said clamp plate assemblies further being angularly movable, from side to side, in a plane parallel to said weight bodies;

support means, provided between said pair of clamp plate assemblies and said weight bodies, for supporting said pair of clamp plate assemblies; and

an end plate which is secured to said hollow housing for covering said hollow housing in which said weight bodies and said clamp plate assemblies are accommodated, the workpiece being firmly held in and by said center insertion opening of said clamp plate assemblies at at least four points of said center insertion opening by the outward displacement of said weight bodies, due to a centrifugal force acting thereon when said chucking device rotates.

4,709,513

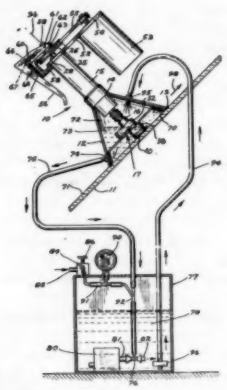
GLASS SCRATCH REMOVAL METHOD

Eddie S. Tingley, Bloomington, Minn., assignor to Novus Inc., Minneapolis, Minn.

Division of Ser. No. 700,636, Feb. 11, 1985. This application Jul. 31, 1986, Ser. No. 891,293

Int. Cl.[4] B24B *1/00*

U.S. Cl. 51—283 R **5 Claims**



1. A method for removing scratches from a smooth surface of a hard, substantially nonporous material while such material is in place for use comprising the steps of:

mounting a rotating tool on a manually movable support about an axis which is generally normal to the surface and supporting said tool and support on said surface;

providing a resilient force relative to the support urging said tool toward said surface with the support engaging the surface and manually controlling the position of the tool relative to the support to permit selectively moving the tool away from said surface and to permit controlling the force of the tool against the surface up to a preselected maximum;

rotating said tool; and

moving the support along the surface and over the region where the scratch is to be removed and manually holding the tool spaced from said surface until the support is moving along said surface and gradually lowering said tool into engagement with said surface while the support is being moved across said surface.

4,709,514

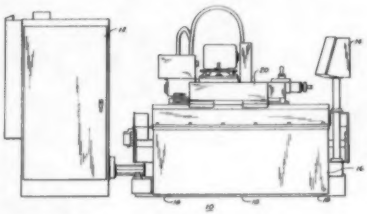
DUAL WHEEL CYLINDRICAL GRINDING CENTER

Richard P. Chase, Spencer; Gary E. Englander, Paxton, both of Mass.; Martin A. German, Solon, and Joseph F. Volk, Chagrin Falls, both of Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 506,076, Jun. 20, 1983, Pat. No. 4,510,716, which is a division of Ser. No. 228,424, Jan. 26, 1981, Pat. No. 4,443,975. This application Apr. 3, 1985, Ser. No. 719,370

Int. Cl.[4] B24B *1/00*

U.S. Cl. 51—325 **16 Claims**



1. A method for dressing a complex contour onto a driven grinding wheel of a grinding machine, said grinding machine including a carriage upon which said driven grinding wheel is mounted and at least a first dressing means mounted opposite said grinding wheel; said method comprising the steps of:

(1) providing means for simultaneously moving said carriage and grinding wheel along first and second substantially orthogonal axes;

(2) providing a programmable controller responsive to a set of preprogrammed instructions for controlling the moving means of step 1;

(3) selectively moving said carriage and grinding wheel in relationship to said dressing means along said first axis by said preprogrammed instructions and said programmable controller;

(4) selectively moving said carriage and grinding wheel in relationship to said dressing means along said second axis by said preprogrammed instructions and said programmable controller;

(5) continuously adjusting said selective movements of steps 3 and 4 by said preprogrammed instructions until said grinding wheel is dressed to the desired complex contour.

4,709,515

WET SANDBLASTING SYSTEM

Henry Copeland, 156 Barrios St., and Steve M. Copeland, Rte. 2, 307 Karen Dr., both of Lockport, La. 70374

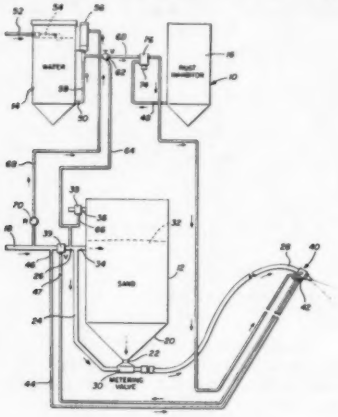
Filed Jul. 15, 1986, Ser. No. 885,669

Int. Cl.[4] B24C *5/04, 7/00*

U.S. Cl. 51—436 **6 Claims**

1. A wet sandblasting system including a closed abrasive tank including abrasive outlet means, a pressurized air supply line, an air conduit including an air inlet end and an air outlet end, a discharge nozzle on said outlet end, air pressure openable and normally closed air valve means communicating said air line with said inlet end, a metering discharge valve operatively associated with said abrasive outlet means and serially disposed in said air conduit, a control air line including an inlet end communicated with said supply line upstream from said air valve means and an outlet end connected to said air valve means for actuation thereof, a control valve disposed adjacent said nozzle and serially connected in said control air line, liquid tank means having liquid outlet means, an air operated pump subject to stalling at a predetermined back pressure, a liquid delivery line including an inlet end and an outlet end, said pump being operatively connected to said liquid outlet means and said liquid delivery line inlet end for pumping liquid from

said outlet means to said liquid delivery line inlet end, said nozzle including liquid injection means for injecting liquid into the air and abrasive stream passing through said nozzle, air supply means for supplying air under pressure from said air supply line upstream from said air valve means to said pump for operation thereof, air pressure openable and normally closed control valve means serially connected in said liquid delivery line, control air conduit means communicating said air



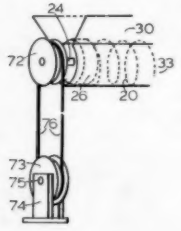
conduit, downstream from said air valve means, with said control valve means for opening said control valve means, said air supply means including air pressure reducing means operatively associated therewith for reducing the pressure of air supplied to said pump relative to the pressure of air in said air conduit downstream from said air valve means, said outlet end of said liquid delivery line being communicated with said liquid injection means.

4,709,516

SELF-CLEANING GUTTER DEVICE

Geoffrey H. Gleaves, Hackensack, N.J., assignor to Ropol, Inc., Mahwah, N.J.

Filed Dec. 9, 1985, Ser. No. 806,482
Int. Cl.[4] E04D *13/00*
U.S. Cl. 52—11 **2 Claims**



1. A self-cleaning gutter device comprising:

an elongated, self-supporting flexible member capable of being placed within and along the length of a gutter; and;

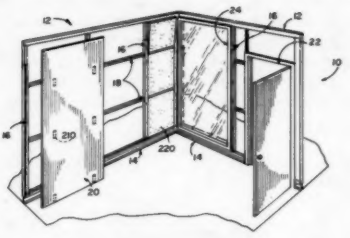
means for remotely activating said flexible member such that debris in said gutter is transported by said flexible member along said gutter to a discharge outlet, said flexible member being in the form of an elongated helix or coil, one end of which is connected to said remote activating means by being fitted within a reinforcing hub such that said coil transports said debris in the manner of a screw conveyor.

4,709,517

FLOOR-TO-CEILING WALL SYSTEM

Terry L. Mitchell, and Robert J. Poortvliet, both of Jenison, Mich., assignors to Architectural Wall Systems, Inc., Grand Rapids, Mich.

Filed Jun. 2, 1986, Ser. No. 869,439
Int. Cl.[4] A47B *5/00*
U.S. Cl. 52—36 **20 Claims**



1. A floor-to-ceiling wall assembly for use in a room having a floor surface and a ceiling comprising:

a ceiling channel comprising a pair of spaced, downwardly depending sidewalls joined by a top wall adapted to be secured to the ceiling, a pair of upper lips projecting inwardly from said sidewalls of said channel at a point spaced below said channel top wall and above the bottom edges of said sidewalls;

a floor runner having means for receiving the lower ends of vertical studs and holding same in a fixed position;

a plurality of generally vertically telescoping studs each having a lower portion and a mating upper portion, said telescoping studs having lower ends seated on said floor runner and upper ends slidably received in and suspended by said ceiling channel, said upper ends of each of said telescoping studs including at least semi-resiliently deformable lateral projections which are adapted to semi-resiliently deform and seat on top of said upper lips as said upper portion is raised to thereby snap over said upper lips and suspend said upper portion of said stud from said ceiling channel;

means for securing said studs against lateral movement in said ceiling channel;

a plurality of stringers extending between said lower portions of said studs, said studs and stringers including matingly and releasably engaging securing means whereby a stud seated in said floor runner can be laterally adjusted at its top until vertically oriented and then secured, and the remainder of said studs aligned by positioning said stringers between adjacent studs.

4,709,518

UNIVERSAL FASCIA ASSEMBLY FOR SECURING A MEMBRANE TO A ROOF

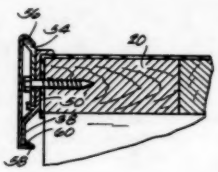
Bennie L. Lane, W347 S7194 Sprague Rd., Eagle, Wis. 53119

Filed Oct. 23, 1986, Ser. No. 922,242
Int. Cl.[4] E04D *13/15*
U.S. Cl. 52—94 **7 Claims**

1. Apparatus for securing a rubber membrane to a roof, the roof having an upper surface and the edge of the roof defining a generally vertical surface, the rubber membrane being supported by the upper surface of the roof, and a portion of the membrane extending downwardly adjacent the vertical surface of the edge of the roof, the apparatus comprising:

an elongated membrane anchor bar adapted to extend along the edge of the roof, said anchor bar including a generally

planar portion having a rearward surface adapted to secure said portion of the membrane against the vertical surface of the edge of the roof, said anchor bar including an upper edge portion and a lower edge portion, a first flange integrally joined to said upper edge portion of said anchor bar and projecting rearwardly with respect to said rearward surface, said first flange having a generally planar downwardly facing lower surface adapted to engage a planar upper surface portion of the membrane to secure a portion of the membrane downwardly against the upper surface of the roof, and a second flange projecting



forwardly from said vertical planar portion and away from the edge of the roof, said second flange extending along the length of the anchor bar, and said second flange being located intermediate said upper edge portion and said lower edge portion, and said second flange including an upper surface adapted to support a lower edge of an elongated support plate, and

means for securing the elongated membrane anchor bar to the vertical surface of the edge of the roof, the means for securing including a fastener adapted to extend through the vertical planar portion of the anchor bar into the edge of the roof.

4,709,519

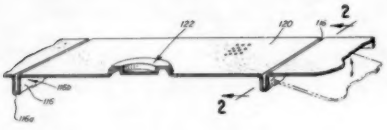
MODULAR FLOOR PANEL SYSTEM

Allen C. Liefer, R.R. 3, Box 362, Macon, Mo. 63552; Gilbert L. Loewen, 802 Walnut St., and Paul J. Magathan, 502 Maple St., both of Peabody, Kans. 66866

Continuation-in-part of Ser. No. 471,860, Mar. 3, 1983, Pat. No. 4,557,086. This application Jul. 15, 1983, Ser. No. 514,161

Int. Cl.⁴ E04C *1/00*

U.S. Cl. 52—98 **17 Claims**



1. A modular grain bin floor comprising in combination:

(a) a plurality of elongated modular grain bin floor panels each having opposite side edges and opposite ends, each of said panels formed of bendable sheet metal and including a plurality of modules each located between said side edges, said modules of each panel being disposed in end-to-end relation to one another and forming a substantially continuous upper surface extending the length of said panel between said opposite ends, a reverse-bend hem of said sheet metal extending transversely of the respective panel between and integrally joining each adjacent pair of said modules to one another, each of said hems extending downwardly relative to said upper surface and providing transverse support for said panel, and each of said hems providing means for facilitating severance of said modules whereby at least one of said modules can be separated from the respective modular floor panel along such hem for forming panels of selected lengths, said panels being disposed in coplanar relationship with one another and with said side edges of adjacent panels adjacent to one another;

(b) a support beam extending subjacent each said pair of adjacent panel side edges; and

(c) a plurality of support posts for each of said beams, each of said posts straddling the respective beam and being in generally vertical alignment therewith.

4,709,520

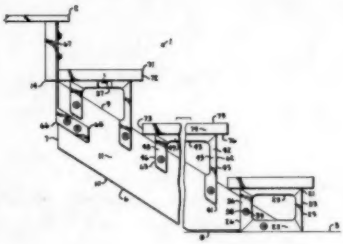
STAIR BRACKETS AND STAIR STRUCTURE

Richard L. Vochatzer, 232 N. 31st St., Kansas City, Kans. 66102

Filed Jul. 28, 1986, Ser. No. 889,773

Int. Cl.⁴ E04F *11/00*

U.S. Cl. 52—191 **2 Claims**



1. A stair structure extending between upper and lower floors, which comprises:

(a) a parallel, spaced pair of stringers, each including:

(1) upper and lower ends;

(2) upper and lower edges; and

(3) inside and outside faces;

(b) a discrete pair of lower brackets each including:

(1) a vertical faceplate;

(2) a horizontal baseplate placed between a respective stringer lower end and said lower floor;

(3) front and back ends;

(4) front and back strips extending from said faceplate at said front and back ends respectively;

(5) a top strip extending from said faceplate in spaced relation over said stringer upper edge; and

(6) a locating flange extending forwardly from said back strip and positioned against said stringer upper edge;

(c) a discrete pair of angle brackets each including:

(1) a vertical faceplate with an opening defining front, back and top portions;

(2) front and back ends;

(3) front, back and top strips extending from said faceplate front, back and top portions respectively, said top strip being positioned in spaced relation over a respective stringer upper edge; and

(4) front and back locating flanges extending downwardly and forwardly from said front and back strips respectively and engaging said stringer upper edge;

(d) a lower tread mounted on the top strips of said pair of lower brackets and extending therebetween;

(e) an upper tread mounted on said pair of angle brackets and extending therebetween;

(f) a pair of discrete stringer hangers each mounted on a respective stringer upper end and attached to said upper floor, each said stringer hanger including a joist section attached to a joist of said upper floor and a stringer section attached to a respective stringer upper end; and

(g) fastening means fastening said bracket faceplates to respective stringer faces.

4,709,521

METHOD OF INSERTING A TUBULAR OR BAR-SHAPED STRUCTURAL MEMBER TIGHTLY INTO A LOCATION HOLE IN A CONSTRUCTION ELEMENT

Georg Walz, Nibelungenstrasse 16, 7920 Heidenheim/Brenz, Fed. Rep. of Germany

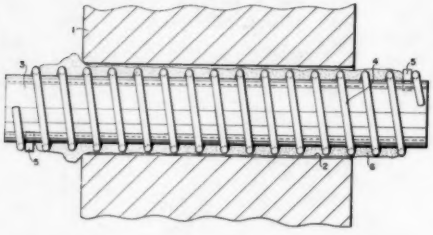
PCT No. PCT/EP85/00530, § 371 Date Mar. 20, 1986, § 102(e) Date Mar. 20, 1986

PCT Filed Oct. 10, 1985, Ser. No. 857,758

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 59-112786

Int. Cl.[4] E04B *5/48*

U.S. Cl. 52—220 6 Claims



1. A feeding line house lead-in protective device for mounting in a masonry opening, the device comprising:

a lead-in tube for insertion into a slightly larger masonry opening, the lead-in tube having an outer surface;

an auxiliary element in the form of a helical tension spring extending around the outer surface of said tube, said spring having a stretched state and a retracted state; and

means for axial fixation of the ends of said tension spring when the spring is in the stretched state.

4,709,522

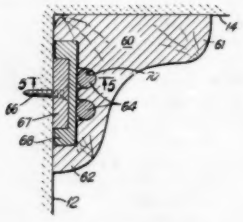
REMOUNTABLE WALL/CEILING MOLDING

V. B. Carnahan, 522 Devils Hole Rd., R.D. #1, Cresco, Pa. 18326

Filed Nov. 20, 1986, Ser. No. 932,623

Int. Cl.[4] E04F *19/02*

U.S. Cl. 52—287 6 Claims



1. A removable and remountable molding for a ceiling/wall or the like planar intersection, said molding comprising:

(a) a plurality of elongated magnetic mounting bars, said bars including attachment means for mounting said magnetic bars in spaced apart linear relationship outwardly from a flat surface proximate its intersection with another flat surface;

(b) at least one elongated molding member, said member being a single continuous strip including on its rear two flat-sided return spans, said returns being at generally right angles one to the other with one of said returns including an indented parallel area, said indented area being presized to match said mounting bars' outward projection when mounted; and,

(c) at least one magnetized band attached to said molding strip at said indented return end,

so that when said magnetic mounting bars are mounted proximate a planar surface intersection, said molding member may be removably mounted on said magnets by said magnetized band, said indented area on said return spacing the overfit of said molding member on said intersection to hide said mounting bars and to provide flush mounting of said molding to said intersection.

4,709,523

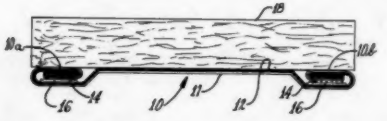
INSULATION BATT WITH PRESS-ON FACING FLANGES

Thomas B. Broderick, Granville; Donald J. Algrim, Reynoldsburg, and Richard F. Hayden, Columbus, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Aug. 18, 1986, Ser. No. 897,454

Int. Cl.[4] E04B *1/88*

U.S. Cl. 52—406 10 Claims



1. Faced insulation comprising a fibrous insulation batt, a facing having a facing flange normally extending transversely outwardly from an edge of the batt when in a condition for installation of the batt, pressure-sensitive adhesive on a side of the facing flange adjacent the batt when the facing flange is extended outwardly form the edge of the batt, and a release strip on an inner side of the facing inwardly of but adjacent said facing flange, the facing flange being folded inwardly between the batt and the remainder of the facing when in a condition for storage and shipment of the faced insulation, with the pressure-sensitive adhesive in engagement with said release strip, the facing transversely inwardly of the inwardly folded facing flange being adhered to a major surface of the batt.

4,709,524

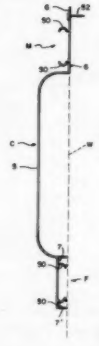
PRESSURE SLIP EXPANSION JOINT

Joseph L. Knight, Box 167, Shippenville, Pa. 16254

Filed Aug. 26, 1986, Ser. No. 900,393

Int. Cl.[4] E04D *1/00*

U.S. Cl. 52—536 8 Claims



1. A building component includes a central main section from which extend opposite underlying and overlying sections each having a rear face and a front face, wherein said underly-

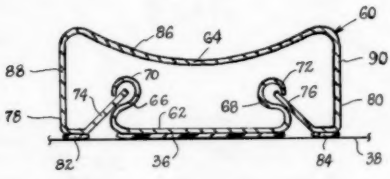
ing and overlying sections are planar and disposed in laterally offset parallel planes, a pair of mating attachment members respectively on said underlying section and overlying section, wherein said attachment member on said underlying section is affixed to said front face thereof and said attachment member on said overlying member is affixed to said rear face thereof, said attachment members each including a pair of opposed non-planar flanges projecting respectively from said underlying and overlying sections, said flanges of each said pair of flanges define an arcuate configuration and being configured and spaced from each other to provide a snap-fitting attachment upon joining one said attachment member of one said building component with another one said attachment member of an adjacent like building component.

4,709,525

MOLDING FOR AUTOMOBILE BODY PANELS, SUCH AS DOORS

Robert Adell, Sunnyvale, Tex., assignor to U.S. Product Development Company, Sunnyvale, Tex.

Filed Nov. 19, 1986, Ser. No. 932,778
Int. Cl.[4] E04F *19/02;* **B60R** *13/04, 19/42*
U.S. Cl. 52—718.1 **6 Claims**



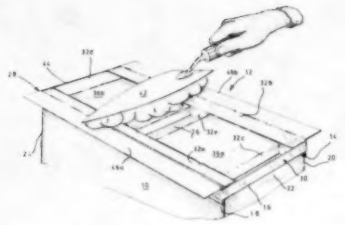
1. In combination with the exterior surface of a vehicle body panel, such as a door, a decorative molding comprising an inner elongated metal part having a central portion and longitudinal marginal edge portions bounding said central portion, said central portion being disposed against the vehicle body panel and non-metallic means attaching said central portion to the vehicle body panel, a layer of non-metallic insulating material extruded onto the surface of said central portion disposed against the vehicle body panel such that said layer is disposed between said inner part and said body panel to insulate the metal of the inner part from the body panel, and an outer elongated metal part comprising a central portion bounded by longitudinal marginal edge portions, said longitudinal marginal edge portions of said inner and outer parts comprising mutually interlocking channels via which the outer part attaches to the inner part, the channels of said inner part facing away from each other, the outer part being constructed and arranged in relation to the inner part such that the outer part fully conceals the inner part and includes body-confronting portions of its own channels disposed to confront the body panel, and non-metallic insulating material extruded as a layer onto respective surfaces of the respective body-confronting portions of the channels of said outer part disposed against the body panel such that said last-mentioned layer insulates the metal of said outer part from the body panel, and in which said mutually interlocking channels are constructed and arranged such that the channels of said inner part are spaced outwardly away from the body panel, and free edge portions of the channels of said outer part are disposed contiguous said body-confronting portions and project away from the body panel to be received into the channels of said inner part.

4,709,526

MORTAR APPLICATION TEMPLATE

John T. Crumby, P.O. Box 23304, Knoxville, Tenn. 37923, assignor to John T. Crumby

Filed Apr. 21, 1986, Ser. No. 853,852
Int. Cl.[4] E04D *15/00*
U.S. Cl. 52—749 **7 Claims**



1. A template device for applying mortar to the exposed top surface of a precast concrete block or the like upon which other blocks are to be stacked during building operations, said top surface including a substantially rectangular perimeter having parallel longitudinal sections joined at their ends by parallel lateral sections of lesser length and at least one further parallel lateral interconnecting the longitudinal sections at a spaced location from their ends such that said top surface defined at least two openings spaced apart by said further parallel lateral sections, said template device comprising:

a frame having an outline similar to said rectangular perimeter of said top surface and including wall means defining mortar receiving openings which are substantially coextensive with said longitudinal and lateral sections of said top surface upon proper placement of said frame on said top surface, said wall means having a depth substantially equal to a desired thickness of mortar to be applied to said top surface, said frame member further including cover members attached to said wall means substantially coextensive with said openings in said top surface when said frame is properly placed on said top surface; and

guide means carried by said frame for proper placement of said frame on said top surface whereby said mortar receiving openings therein properly register with said sections of said top surface and said cover members register with said openings in said top surface when a user places said device on said surface of said block and applies mortar thereto as with a trowel, said mortar filling said mortar receiving openings in said device and thereby being applied to said sections of said top surface in a thickness substantially said thickness of said frame wall means without mortar falling into said openings in said top surface.

4,709,527

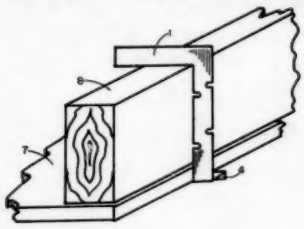
SHEETROCK HANGING TOOL

John Cooley, 208 Haystack Rd., Zephyrhills, Fla. 34249

Filed Oct. 21, 1986, Ser. No. 921,615
Int. Cl.[4] E04D *15/00*
U.S. Cl. 52—749 **2 Claims**

1. A sheetrock hanging tool comprising a rigid steel having a first, second and third legs, said first and second legs being contiguous, flat and coplaner with each other, said third leg bent substantially at right angles to the plane of said first and second legs, said first, second and third legs defining a gener-

ally rectangular opening, saaid third leg bearing a bent lip, said second leg bearing a multiplicity of notches, said notches of a



size and shape to accept one or more nails whereby said tool may be temporarily retained against a flat surface.

4,709,528

APPARATUS FOR PRODUCING BAG PACKAGES HAVING DISPENSING FITMENTS

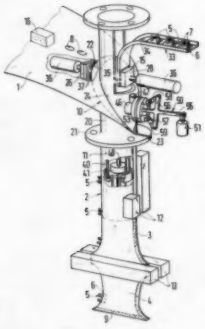
Minne Merkus, Weert, Netherlands, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 21, 1987, Ser. No. 5,988

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1986, 3612196

Int. Cl.[4] B65B *9/06*

U.S. Cl. 53—128 **8 Claims**



1. An apparatus for producing bag packages (4) from a strip of heat sealable packaging material (1) having long edges which comprises a packaging material former (10) which shapes the strip of packaging material into a tube (2), said packaging material former (10) includes a tube former (11), with a surrounding tubular guide fitting (20), an oblique collar (22) which guides the tube in conjunction with an inlet opening on said guide fitting (20), a lengthwise seam sealing device (12) that joins the long edges of the strip of packaging material, a crosswise sealing and advancing device (13) that advances the tube incrementally and divides the tube into individual bag packages after they have been filled with a product, a dispenser for dispensing fitments to be secured to said packaging material, a device (15) for fastening dispensed fitments (5) to said tube, means for forming holes in said packaging material for receiving said fitments (5) which are secured to said packaging material, said device (15) including a holder (28) that receives one fitment at a time from a conveyor device (33) that conveys said fitment to said holder (28), a heat sealing stamp disposed opposite to said holder (28), said heat sealing stamp including blind bores (37) for receiving tubes of said fitments and a heating device for heating said package material in the vicinity thereof, said securing device (15) is disposed in the vicinity of said packaging material former (10), and an opening (29, 30) in said collar (22) and an opening (31) in said tube former (11), said sealing device (26) is movable into said opening in said collar (22) and said holder (28) is movable into said opening (31) of said tube former (11) toward the inside of the tube (2) being formed, whereby the fitment is secured to the packaging material as a liquid is filled into a previously formed bag.

4,709,529

HIGH-SPEED WRAPPING MACHINE

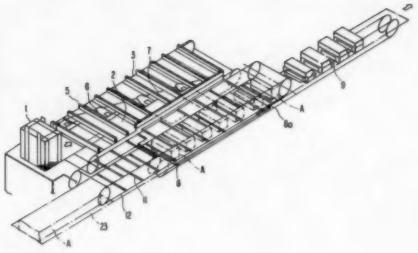
Katsumi Matsuda, and Kunio Kono, both of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 11, 1986, Ser. No. 873,778

Claims priority, application Japan, Aug. 15, 1985, 60-179872

Int. Cl.[4] B65B *11/20*

U.S. Cl. 53—207 **2 Claims**



1. A high speed wrapping machine for wrapping articles with flat sheets stored in a magazine, said machine comprising:

a magazine conveyor extending in a transporting direction from said magazine for transporting the sheets one at a time from said magazine in said transporting direction,

said magazine conveyor having a plurality of guide rails moving in said transporting direction which extend in a second direction that is perpendicular to said transporting direction, and a plurality of sheet sliders for supporting respective ones of the sheets transported by the magazine conveyor, each of said sheet sliders respectively slidably mounted on one of said guide rails, and slider means operatively connected to said sheet sliders for sliding said sheet sliders with respective ones of the sheets supported thereon along said guide rails in said second direction as the guide rails move in said transporting direction for successively delivering the sheets from the transporting conveyor in said second direction as the sheets are concurrently transported in said transporting direction;

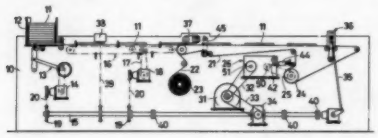
a case transporting conveyor adjacent and extending parallel to said magazine conveyor for receiving the sheets delivered in said second direction by said magazine conveyor, said case transporting conveyor having a plurality of sheet guides thereon defining buckets each for receiving one of the sheets delivered by said magazine conveyor, and synchronizing means for synchronously driving said case transporting conveyor in said transporting direction with said magazine conveyor; and

articles transfer means above said transporting conveyor for continuously transferring the articles to be wrapped by the sheets onto the case transporting conveyor after the sheets have been delivered thereto by said magazine conveyor, each of the articles being transferred by said article transfer means onto one of said buckets on which a respective sheet has been received by the case transporting conveyor from the magazine conveyor.

4,709,530
CENTRALIZED DRIVE DEVICE IN A PACKAGING MACHINE

Aris Ballestrazzi, and Lamberto Tassi, both of, Savignano Sul Panaro, Italy, assignors to Sitma Societa Italiana Macchine Automatiche S.p.A., Spilamberto, Italy

Filed Jul. 8, 1986, Ser. No. 883,150
Claims priority, application Italy, Jul. 17, 1985, 22526/85[U]
Int. Cl.[4] B65B *11/12*
U.S. Cl. 53—209 **4 Claims**

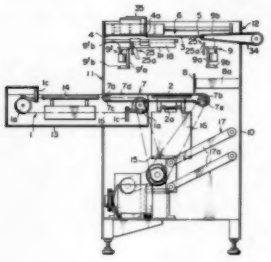


1. A machine for packaging products in continuous plastic film unwound from a reel, the machine comprising a conveying belt for conveying the products, and a sequence of product treatment units associated with the belt including a feeder unit for the products, an individual product advancing unit for receiving products from the feeder unit and delivering same to a receiving end of the conveying belt, a unit for wrapping said products in said film on the conveying belt, and a unit for welding and cutting the individual packaged products adjacent a delivery end of the conveying belt, a rigid transmission shaft extending along the length of the conveying belt from said feeder unit to said welding and cutting unit, a central variable-speed drive for the shaft, a series of individual motion transmissions driven from the shaft each for operating one of said units of the machine, and a further variable-speed drive with a positive transmission connected with the central variable-speed drive for driving the conveying belt.

4,709,531
STRETCH FILM PACKAGING MACHINE

Toshio Denda, Tokyo, Japan, assignor to Teraoka Seiko Co., Ltd., Tokyo, Japan

Filed May 17, 1985, Ser. No. 735,134
Claims priority, application Japan, May 23, 1984, 59-76300[U]; Jul. 31, 1984, 59-118936[U]
Int. Cl.[4] B65B *11/18, 53/00, 61/00*
U.S. Cl. 53—415 **17 Claims**



1. A stretch film packaging machine for covering trays with stretch film comprising:

(a) a pusher conveyor for conveying said trays towards an entrance port of said stretch film packaging machine;

(b) at least one elevator head adapted to be moved between two positions for transporting said tray, said two positions comprising an upper position and a lower position, wherein said at least one elevator head is positioned at a downstream end of said pusher conveyor;

(c) means for positioning and cutting at least one stretch film to cover said trays, wherein said stretch film is adapted to be cut to a desired length and positioned above said at least one elevator head;

(d) a discharging passage for discharging said covered trays;

(e) at least one transporting belt extending from said pusher conveyor to said at least one elevator head wherein said at least one transporting belt is located between a transporting end of said pusher conveyor and said lower position of said at least one elevator head;

(f) a position setting plate positioned at a transporting end of said at least one transporting belt;

(g) a receiving passage located above said stretch film for receiving said tray;

(h) at least one folding plate arranged adjacent to a side of said receiving passage for folding said stretch film to cover said tray on said at least one elevator head when said at least one elevator head is moved toward said upper position;

(i) means for operating said pusher conveyor at a first predetermined operating speed;

(j) means for operating said at least one transporting belt at a second predetermined operating speed which is greater than said first predetermined operating speed of said pusher conveyor;

(k) a discharging pusher which is moveable towards said discharging passage;

(l) at least one side plate positioned parallel to a direction of said discharging said covered tray;

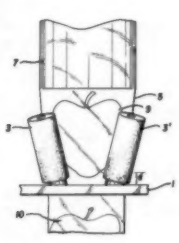
(m) at least one sliding plate including means for sliding the plate in a direction perpendicular to said at least one side plate wherein packaging trays are adapted to be pushed by said discharging pusher onto said at least one sliding plate; and

(n) a heating belt aligned with said discharging passage, said at least one sliding plate mounted over said heating belt.

4,709,532
VERTICAL FORM-FILL SEAL PROCESS AND MACHINE WITH PRODUCT CATCHING DEVICE

Monroe F. Taylor, Greenville, S.C., assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.

Filed Dec. 3, 1986, Ser. No. 937,268
Int. Cl.[4] B65B *9/20, 9/08*
U.S. Cl. 53—451 **6 Claims**



1. In a vertical form, fill, and seal machine for individually packaging product articles in transversely sealed tubes formed from thermoplastic film, the improvement for packaging an easily bruised article comprising:

(a) transverse heat sealing and severing means for simultaneously sealing the bottom of an upper package and the top of a lower package and severing the tubular film between said seals; and,

(b) catcher finger means associated with said sealing and severing means to catch and hold said individual article thereby preventing said article from striking either the bottom seal or transverse compression of the tube immediately below the held article or from striking the heat sealing means as the article is vertically dropped into the

tube and thereby holding said article spaced vertically from said transverse compression or seal area.

4,709,533

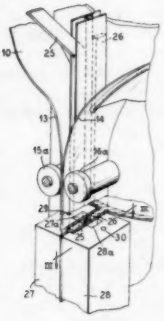
METHOD AND APPARATUS FOR MAKING RECLOSABLE BAGS IN A FORM, FILL AND SEAL MACHINE

Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

Filed Dec. 22, 1986, Ser. No. 944,980

Int. Cl.[4] B65B *9/00*

U.S. Cl. 53—451 **19 Claims**



1. The method of forming a vertical tubular form fill reclosable package from a sheet of plastic film comprising the steps:

continuously feeding a supply of thin thermoplastic film from a supply means;

wrapping the film into tubular shape over a filling spout bringing the lateral edges of the film together in abutting face-to-face relationship to form a tube;

attaching the faces of said edges together at a seal location to form a fin seal;

feeding a continuous supply of plastic zipper strip having first and second interlocking members each with a web on either side of said interlocking member into a space between said spout and said seal location;

and attaching said members along their webs to the inner surface of the film between said seal location and said spout to provide a reopenable closure between the fin seal and contents of the tube supplied through the filling spout.

4,709,534

BAG FOR INFUSION SOLUTIONS AND THE LIKE AND METHOD OF MANUFACTURING THE SAME

Karl-Heinz Sengewald, Postfach 1460, 4801 Halle in Westf. 1, Fed. Rep. of Germany

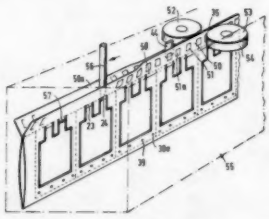
Continuation of Ser. No. 471,140, Mar. 1, 1983, abandoned. This application Aug. 26, 1985, Ser. No. 770,001

Claims priority, application Fed. Rep. of Germany, May 15, 1982, 3218415

Int. Cl.[4] B65B *3/02*

U.S. Cl. 53—452 **15 Claims**

1. A method of manufacturing bags for infusion solutions and the like, comprising the steps of producing an elongated hose element of a synthetic thermoplastic foil in aseptic condition; laminating said elongated hose element by another outer thermoplastic foil by fixedly connecting said another thermoplastic foil to said hose element so as to form an elongated hose having two walls each composed of at least two connected foil layers; forming in said hose a plurality of shaped bag elements each having a body part and at least one connecting part which are of different widths and shapes, by a welding seam extending within said hose always through said four layers of said two walls of said hose and over and entire shaped contour of said body part and said connecting part of each of said bag elements; thereafter cutting said hose outwardly around said shaped welding seam of each of said bag elements by a shaped cut around said body part and said connecting part of each said shaped bag elements with said walls in contact with one another, so as to form a plurality of shaped bags each having a



body part and at least one connecting part which are of different widths and shapes; filling each of said bags by introducing a filling element through said opening of said connecting part with spreading apart said walls in the region of said connecting part; and closing said connecting part of each of said bags.

4,709,535

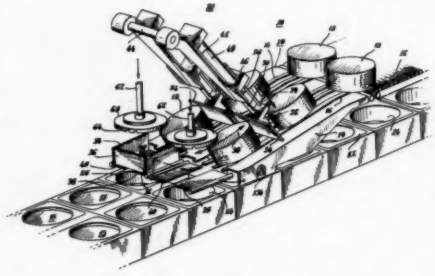
PACKAGING LOADER APPARATUS FOR SLICED FOOD PRODUCTS

Reid A. Mahaffy, Montclair, N.J.; Eugene Garson, Bronx, N.Y., and Milan R. Ostrow, Pequannock, N.J., assignors to Mahaffy & Harder Engineering Co., Fairfield, N.J.

Continuation-in-part of Ser. No. 724,404, Apr. 18, 1985, abandoned. This application Apr. 11, 1986, Ser. No. 850,940

Int. Cl.[4] B65B *5/06, 39/00*

U.S. Cl. 53—473 **23 Claims**



1. In a vacuum packaging apparatus of the type comprising means to support and move semi-rigid packaging material through a series of stations where packaging operations are performed, said stations comprising a loading station where stacks of thinly-sliced, flexible food products are to be placed in cup-shaped receptacles formed of said semi-rigid packaging material and dimensioned to provide a close fit with said stacks of product;

automatic loading apparatus for transferring said stacks of product successively into said cup-shaped receptacles without the need for human manipulation, comprising:

a drop station having pivoted trap door means normally spring-biased into horizontal position;

a downwardly-inclined conveyor having its lower end immediately adjacent said drop station and serving to convey stacks of sliced product down to said trap door means;

a pusher arm rotatably mounted above said drop station and having at its lower end a retractable pusher arranged to swing with said arm through an arcuate path forwardly over said downwardly-inclined conveyor to engage a

stack of product on the lower portion thereof to shift said stack onto said trap door means;

ram means mounted directly above said trap door means and operable to be driven down to press a stack of product through said trap door means and into a waiting receptacle; and

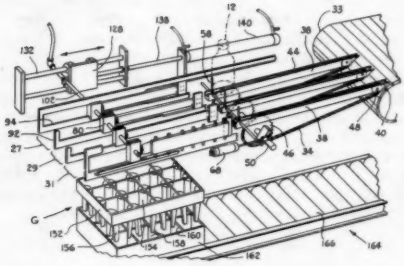
means to retract said pusher from its lower position engageable with a stack of product to an upper position wherein said pusher can be swung rearwardly above the advancing stacks of product to permit said pusher to be shifted back down between the next set of stacks so as to be swept forward again to engage and transport another stack to said trap door means.

4,709,536

ARTICLE TRANSPORT APPARATUS

Robert G. Hartness, Greer, and Thomas S. Hartness, Greenville, both of S.C., assignors to Hartness International, Inc., Greenville, S.C.

Filed Jan. 28, 1987, Ser. No. 7,795
Int. Cl.[4] B65B *35/36, 35/44, 39/02*
U.S. Cl. 53—539 **24 Claims**



1. A case packing apparatus for loading groups of articles into cases, the articles having top, bottom, and side portions, the case packing apparatus comprising:

conveying means for supplying a flow of articles in a plurality of aligned rows in a predetermined direction;

a receiving station for receiving articles supplied by said conveying means in said plurality of aligned rows;

a loading station for loading articles in said plurality of aligned rows into cases;

a carriage movable between said receiving station and said loading station for carrying articles in said plurality of aligned rows from said receiving station to said loading station, said carriage defining a receiving end having article passageways through which articles may be received;

carriage transfer means for moving said carriage to a receiving position in a direction opposite said predetermined direction of said flow of articles supplied by said conveying means for causing said receiving end of said carriage to receive articles, thereby allowing said carriage to encompass a predetermined number of articles at said receiving station;

article engagement means carried by said carriage for selectively engaging articles encompassed by said carriage and for substantially fixing the articles to said carriage for movement therewith;

said carriage transfer means moving said carriage to said loading station in substantially said predetermined direction of said flow of articles supplied by said conveying means, after engagement of said article engagement means with the articles encompassed by said carriage;

means for disengaging said article, engagement means for depositing articles carried by said carriage at said loading station; and

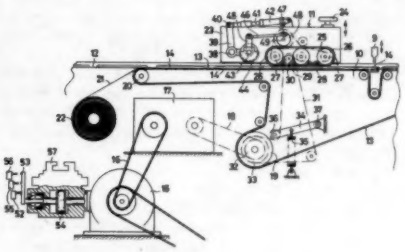
loading means associated with said loading station for loading the articles deposited at said loading station into cases.

4,709,537

LONGITUDINAL WELDING EQUIPMENT IN A PACKER MACHINE

Aris Ballestrazzi, and Lamberto Tassi, both of Savignano Sul Panaro, Italy, assignors to Sitma- Societa Italiana Macchine Automatiche S.p.A., Spilamberto, Italy

Filed Sep. 18, 1986, Ser. No. 908,783
Claims priority, application Italy, Sep. 24, 1985, 23205/85[U]
Int. Cl.[4] B65B *9/06*
U.S. Cl. 53—550 **5 Claims**



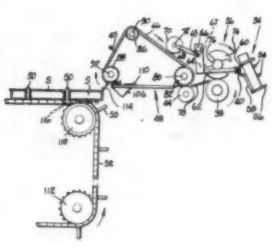
1. Longitudinal welding equipment in a machine for packaging products comprising a horizontal conveyor belt for transporting said products wrapped inside a continuous film of plastic material with said material having overlapping longitudinal side edges, a longitudinal welding means positioned above said overlapped edges, means for imparting an oscillatory rotary-translational motion to said longitudinal welding means in a vertical plane, at least one pressure and accompanying belt located above said products wrapped in side said film, at least one side shoulder mounted above said products for positioning said at least one pressure and accompanying belt above said conveyor belt, central motor means for operatively driving in common said longitudinal welding means and said pressure belt and said conveyor belt, and temperature means for selectively controlling the temperature of said longitudinal welding means to correlate with the packaging speed.

4,709,538

APPARATUS FOR FEEDING AND OPENING A BEVERAGE CARRIER

Peter C. Olsen, Jr.; Peter M. Conforto, both of Monroe; Jimmy R. Craighead, West Monroe, all of La., and David L. Wolf, Cedar Falls, Iowa, assignors to Manville Corporation, Denver, Colo.

Filed May 9, 1986, Ser. No. 861,470
Int. Cl.[4] B65B *43/24*
U.S. Cl. 53—566 **5 Claims**



1. Apparatus for feeding and opening a collapsed article

carrier sleeve, the sleeve having two side panels foldably connected to the bottom and top panels, the bottom panel and one of the side panels being in opposed generally parallel relationship, having been folded toward each other about their connecting fold line, and the top panel and the other side panel also being in opposed generally parallel relationship, having been folded toward each other about their connecting fold line, each side panel having end flaps foldably connected at each end of the side panel and lying in substantially the same plane as that of the side panel to which it is connected, comprising:

means for moving a collapsed carrier sleeve in a direction generally parallel to the length of the end flaps;

elongated guide means generally aligned with the end flaps of the moving collapsed carrier sleeve, the guide means comprising spaced support surfaces under which the lowermost end flaps of the collapsed carrier sleeve move and over which the uppermost end flaps of the collapsed carrier sleeve move;

retainer surfaces overlying and spaced from the support surfaces a distance allowing longitudinal movement of the uppermost end flaps therebetween but preventing significant movement of the uppermost end flaps transversely of their longitudinal travel;

a fixed stationary cam surface depending from each of the spaced support surfaces, each cam surface sloping downwardly at an angle to the horizontal and in the direction of travel of the carrier sleeve, the cam surfaces being located in the path of travel of the lowermost end flaps and extending downwardly a distance such that movement of the carrier sleeve downstream of the apparatus will cause the leading edges of the lowermost end flaps to engage the cam surfaces and to be moved downward thereby a distance which separates the lowermost end flaps from the uppermost end flaps sufficient to substantially completely open the carrier sleeve;

receptacle means moving downstream of the apparatus for receiving the opened carrier sleeve; and

means for depositing the opened carrier sleeve into the moving receptacle means.

4,709,539

GIRTH STRAP

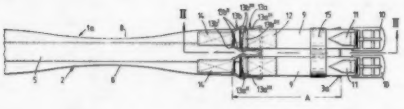
Elizabeth A. Bird, West Midlands, England, assignor to Cottage Industries (Equestrian) Limited, Worcestershire

Filed Sep. 6, 1985, Ser. No. 773,434

Claims priority, application United Kingdom, Sep. 7, 1984, 8422688; Jun. 10, 1985, 8514650

Int. Cl.⁴ B68C *1/14*

U.S. Cl. 54—23 **18 Claims**



18. A strap, for attachment to a saddle or other support, comprising:

a girth strap having a main body with a first end and a second end;

a pair of end straps, each of which has a first end that is releasably attached to said first end of said main body of said girth strap, and a second end; and

respective attachment means provided on said second ends of said end straps, and on said second end of said girth strap, for effecting said attachment of said strap;

said main body of said girth strap being provided with an inside surface which is intended to face toward an animal, and an outside surface which is remote from said inside surface;

each first end of said end straps being provided with an interengaging retaining buckle to effect said releasable attachment to said first end of said main body of said girth strap.

4,709,540

MOWING DEVICE

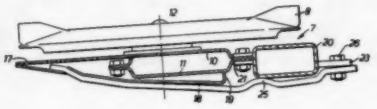
Johannes A. Collart, Heeze, Netherlands, assignor to P. J. Zweegers en Zonen, B.V., Geldrop, Netherlands

Filed Oct. 17, 1985, Ser. No. 788,719

Claims priority, application Netherlands, Oct. 25, 1984, 8403245

Int. Cl.⁴ A01D *34/66*

U.S. Cl. 56—13.6 **8 Claims**



1. A mowing device having an elongated hollow casing disposed transverse to a direction of movement of the moving device, a plurality of adjacent cutting elements rotatable around upwardly extending axes of rotation and supporting upon said casing, transmission means for driving at least some of said cutting elements disposed in said casing, a reinforcing beam extending along a rear side of said casing with respect to said direction of movement and attached to said casing, a plurality of tensioned resilient straps extending transversely to said beam and underneath said casing, said straps having rear ends attached to said reinforcing beam and having front ends connected to a side of said casing away from said reinforcing beam such that a torque is applied to the casing to counteract any torsional movement of the casing during mowing.

4,709,541

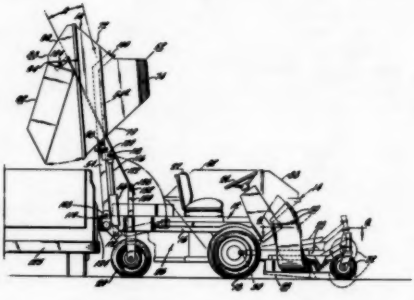
GRASS/LAWN DEBRIS HANDLING SYSTEM

Donald E. Broman; Loren F. Hansen, and Donald J. Huber, all of Lincoln, Nebr., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 581,654, Feb. 21, 1984, abandoned. This application Nov. 26, 1985, Ser. No. 802,075

Int. Cl.⁴ A01D *34/12*

U.S. Cl. 56—202 **22 Claims**



1. A grass/lawn debris handling system for a lawn mower having a side grass discharge duct, said system comprising:

a hopper adapted for mounting on the side of a mower proximate the mower grass discharge duct and having a hopper opening near the upper end of said hopper, at least a portion of said hopper overlying said grass discharge duct,

a chute communicating at its lower end with the mower grass discharge duct and at its upper end with said hopper opening when said hopper is in a filling position, said

hopper having an uppermost portion when in said filling position,

means pivotally mounting said hopper on said mower for movement between said filling position and an elevated dumping position, the lowermost portion of said hopper when in said elevated dumping position being spaced substantially above the position of said uppermost portion of said hopper when in the filling position,

and means selectively operable to effect rotation of said hopper into said elevated dumping position.

4,709,542

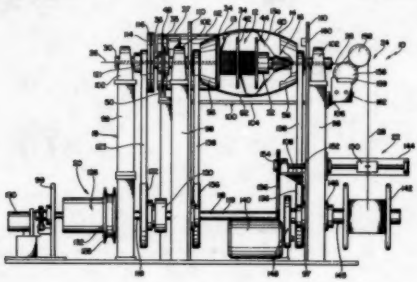
METHOD AND APPARATUS FOR TWISTING FILAMENTS TO FORM A CABLE

Frederic B. Krafft, Holden, Mass., assignor to The Entwistle Company, Hudson, Mass.

Filed Apr. 22, 1986, Ser. No. 855,112

Int. Cl.[4] D07B *3/04, 3/00, 3/12*

U.S. Cl. 57—16 **21 Claims**



1. An apparatus for twisting a filament on an advancing core to form a cable comprising:

a. a reel mounted for rotation about an axis and having a filament wound thereon;

b. a flyer mounted for rotation about said axis so that it travels around said reel, said flyer engaging said filament and being operable for unwinding it from said reel;

c. means for rotating said reel about said axis;

d. means for rotating said flyer about said axis in the same direction as said reel and at a speed which causes said filament to be unwound from said reel;

e. gathering means mounted for rotation about said axis with said flyer, said core passing axially through said gathering means, said filament passing to said gathering means from said flyer, said gathering means twisting said filament around said core element to form said cable;

f. means for drawing said cable from said gathering means; and

g. means for controlling and adjusting the rotational speed of said flyer relative to the rotational speed of said reel to achieve a substantially uniform number of rotations of said flyer per unit length of said cable.

14. A method of forming a cable comprising:

a. winding a first group of filaments onto a reel;

b. unwinding said first group of filaments from said reel with a flyer which rotates around said reel as said reel is rotated and in the same direction as said reel;

c. twisting the unwound filaments from said first group on an advancing core with a rotating closing die to form said cable, said closing die rotating with said flyer;

d. drawing said cable from said closing die; and

e. controlling the rotational speed of said flyer relative to the rotational speed of said reel to achieve a substantially uniform length of twist in said cable.

4,709,543

PRE-TAKE-UP ROLLER MECHANISM FOR VARYING THE TENSION ON A RUNNING THREAD IN A THREAD PROCESSING MACHINE

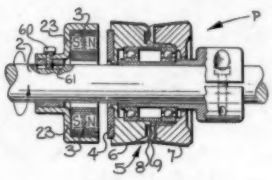
Rainer Lorenz, Nettetal-Breyell, Fed. Rep. of Germany, assignor to Palitex Project-Company GmbH, Krefeld, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 692,683, Jan. 18, 1985, abandoned. This application Sep. 23, 1986, Ser. No. 910,893

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1984, 3403144

Int. Cl.[4] B65H *59/18;* **D01H** *1/10, 13/02*

U.S. Cl. 57—58.7 **10 Claims**



1. A thread processing machine including a take-up mechanism for winding processed running thread at a constant speed into a package after processing by said machine, said take-up mechanism including means for driving the package at a constant peripheral speed; the combination therewith of pre-take-up roller means for varying the tractive force and tension on the running thread being wound by said take-up mechanism and positioned in said machine in advance of said take-up mechanism in the running thread path, said means comprising:

a variably driven rotating drive shaft carried by said machine,

a thread pre-take-up roller rotatably mounted on said drive shaft for rotation with respect thereto for receiving the running thread on the surface thereof and for being driven by the running thread through adhesion, and

an eddy current clutch means operatively connecting said drive shaft and said pre-take-up roller for varying the torque of said pre-take-up roller and thus the tractive force and tension on the running thread by varying the driven rotational speed of said drive shaft while maintaining the constant winding speed of the running thread being wound by said take-up mechanism, said eddy current clutch means comprising permanent magnetic means positioned on and rotating with said drive shaft and a disc of electrically highly conductive material attached to one end of said pre-take-up roller and facing said permanent magnetic means and rotating with said pre-take-up roller and being spaced from said permanent magnetic means for forming an air gap of predetermined distance to create a magnetic field of desired strength in said eddy current clutch means.

4,709,544

REINFORCEMENT ASSEMBLY HAVING A LAYER COMPRISING A SHAPED THREAD: ARTICLES COMPRISING SUCH ASSEMBLIES

Jean-Louis Charvet, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, Clermont-Ferrand, France

Filed Apr. 21, 1986, Ser. No. 854,432

Claims priority, application France, Apr. 29, 1985, 85 06874

Int. Cl.[4] D02G *3/48;* **B60C** *9/00*

U.S. Cl. 57—218 **15 Claims**

1. A reinforcement assembly comprising

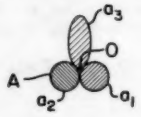
an element having at least one layer and at most three layers of threads wound together;

at least one layer, known as a "shaped thread layer", being

formed, at least in part, of a round thread and a shaped thread;

the twist pitch of each shaped thread being different from the winding pitch of this shaped thread in the shaped thread layer in which it is located;

this difference of pitches being obtained in the following manner, for each shaped thread:



either the twist of said shaped thread is in the direction opposite the winding of said shaped thread in the shoped thread layer;

or the twist of said shaped thread is in the same direction as the winding of said shaped thread in the shaped thread layer, and the ratio

$$\frac{\text{(length of twist pitch)} - \text{(length of winding pitch)}}{\text{(length of winding pitch)}}$$

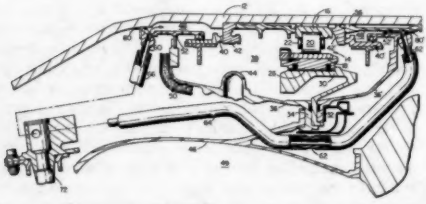
for said shaped thread is at least equal to 0.2 in absolute value.

4,709,545

BEARING COMPARTMENT PROTECTION SYSTEM

Leonard W. Stevens, Vernon; William S. Siwik, Manchester; William A. Moore, Durham; Wayne M. Brown, North Granby, and Andrew A. Barnard, Glastonbury, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 499,633, May 31, 1983, abandoned.
This application Jan. 6, 1986, Ser. No. 816,693
Int. Cl.[4] F02C *7/12, 7/28*
U.S. Cl. 60—39.08 **6 Claims**



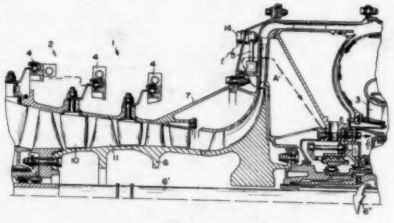
1. For a gas turbine engine having a compressor, and a turbine and shaft interconnecting said compressor and said turbine, a bearing compartment housing a bearing supporting said shaft interconnecting the turbine and compressor located in an environment of hot engine air, said bearing compartment surrounding said shaft and having carbon contact sealing means surrounding said shaft mounted at the ends thereof in close proximity to said shaft, wall means defining open ended chambers defining buffer zones surrounding said shaft adjacent said carbon contact sealing means for receiving buffer air, a source of air extracted from said compressor, fluid connecting means for leading buffer air from said source to a point external of said engine into each of said buffer zones at a point in direct communication with the open end of a chamber so that a portion of said buffer air flows out of each of said open ends of said chambers and into said turbine for cooling purposes, said buffer air being at a pressure higher than the pressure of said hot air in said environment so that a small portion of the buffer air leaks through said carbon seal, and the remaining portion is directed toward said turbine heat exchanger means intermediate said source and said buffer zones for coolign the buffer air prior to being admitted into said buffer azones and the buffer air normally flowing out of said open end flows into said bearing compartment in the event of a failure of said carbon contact sealing means.

4,709,546

COOLED GAS TURBINE OPERABLE WITH A CONTROLLED COOLING AIR QUANTITY

Wolfgang Weiler, Dachau, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union GmbH, Munich, Fed. Rep. of Germany

Filed Apr. 18, 1986, Ser. No. 853,477
Claims priority, application Fed. Rep. of Germany, Apr. 20, 1985, 3514354
Int. Cl.[4] F02C *7/12, 9/16*
U.S. Cl. 60—39.29 **8 Claims**



1. A cooled gas turbine power plant, comprising compressor means for providing a compressed gas flow, a high pressure turbine operatively connected to said compressor means downstream of said compressor means as viewed in the gas flow direction, first control means for controlling said compressor means, second control means for controlling the quantity of cooling air to be supplied to said high pressure turbine, and mechanical means for directly and mechanically coupling said second control means to said first control means for controlling the cooling air directly taken out of said compressor means for supplying the cooling air to said high pressure turbine in response to an operation of said first control means, said first and second control means cooperating for causing the quantity of cooling air supplied from said compressor means to said high pressure turbine means to be proportional to the instantaneous load conditions.

4,709,547

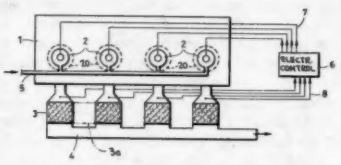
PROCESS FOR THE REGENERATION OF ENGINE EMISSION PARTICULATES DEPOSITED IN A PARTICULATE TRAP

Franz Pischinger, Aachen; Gerhard Lepperhoff, Eschweiler, and Georg Hüthwohl, Aachen, all of Fed. Rep. of Germany, assignors to FEV Motorentechnik GmbH & Co. KG, Aachen, Fed. Rep. of Germany

Filed Feb. 18, 1987, Ser. No. 16,003
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1986, 3605255
Int. Cl.[4] F01N *3/02*
U.S. Cl. 60—274 **13 Claims**

1. In an internal combustion engine having a plurality of engine cylinders operating at a given power output, a process for the regeneration of engine emissio particulates collected in particulate filter traps respectively associated with each of the engine cylinders, comprising the steps of selectively elevating the emission temperature of at least one of the cylinders to the extent required for regeneration, by oxidation, of the filter trap associated therewith, by supplying engine fuel to said at least one of said cylinders in a predetermined amount to produce the

elevated emission temperature, and supply the remaining of said cylinders with amounts of engine fuel less than said predetermined amount as required to sustain the given engine power output.



4,709,548

ARRANGEMENT OF A SOOT FILTER IN THE EXHAUST GAS SYSTEM OF AN INTERNAL COMBUSTION ENGINE WITH AN EXHAUST GAS TURBOCHARGER

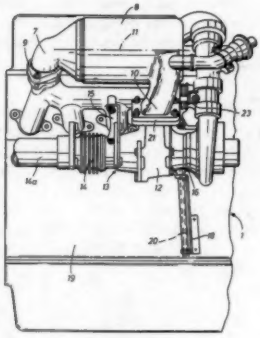
Ulrich Conrad, Ludwigsburg; Guenter Kellermann, Stuttgart; Angela Breymayer, Altbach; Rolf Klinker, Stuttgart; Oswald Schuldt, Korb; Rainer Hoffmann, Ostfildern, and Frank-Dietrich Fabian, Kernen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,629

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1985, 3529542

Int. Cl.[4] F01N *3/02*; F02B *37/00*

U.S. Cl. 60—280 **12 Claims**



1. An arrangement of a soot filter in the exhaust gas system of an internal combustion engine equipped with an exhaust gas turbocharger means whose turbine housing is arranged downstream of the exhaust gas manifold of the internal combustion engine, in which the soot filter and exhaust gas turbocharger means form a unit, the soot filter including a short connecting pipe, said unit being angularly movably retained at the exhaust gas manifold by way of said short connecting pipe and at an exhaust gas pipe connection by way of a first support means, and said unit being retained essentially rigidly in the direction of the internal combustion engine vertical and transverse axes and movably within limits in the direction of the internal combustion engine longitudinal axis at a longitudinal wall of the internal combustion engine by way of further support means arranged at housing means of the exhaust gas turbocharger means.

4,709,549

ASSEMBLY FOR ENGINE EXHAUST GAS PARTICULATE FILTER TRAPS

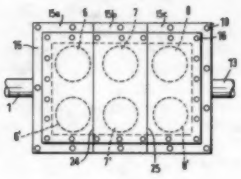
Gerhard Lepperhoff, Eschweiler, Fed. Rep. of Germany, assignor to FEV Motorentechnik GmbH & Co. KG, Aachen, Fed. Rep. of Germany

Filed Mar. 13, 1987, Ser. No. 25,818

Claims priority, application Fed. Rep. of Germany, Mar. 13, 1986, 3608371

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—295 **3 Claims**



1. An assembly for particulate filter traps in which engine exhaust gas particulates are deposited for the treatment of internal combustion engine emission, comprising a filter trap support including a receptacle containing a plurality of individual particulate filter traps arranged side-by-side and parallel to the direction of exhaust gas flow therethrough, a cover on said receptacle, aligned openings in said receptacle and cover coaxial with said traps, an inflow housing coupled to an exhaust pipe section leading from the engine, an outflow housing coupled to another exhaust pipe section through which treated exhaust gas flows, said housings being mounted on opposite sides of said trap support in open communication with said traps via said openings, one of said housings being removably mounted to said cover for inspection of said filter traps through said cover openings upon removal of said one housing, and said cover comprising a plurality of cover sections removably mounted on said receptacle, each of said sections being associated with at least one of said traps to facilitate trap replacement upon removal of at least one of said sections.

4,709,550

HYDRAULIC ASSISTANCE DEVICE

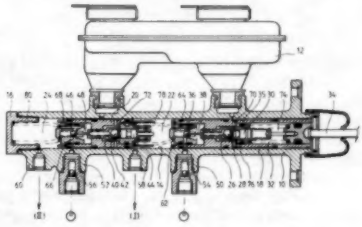
Jean P. Sauvée, Aubervilliers; Christian Riquart, Paris, and Roland Levrai, Stains, all of France, assignors to Societe Anonyme D.B.A., Paris, France

Filed Jan. 14, 1985, Ser. No. 691,346

Claims priority, application France, Jan. 31, 1984, 84 01439

Int. Cl.[4] B60T *11/20*

U.S. Cl. 60—562 **5 Claims**



1. A hydraulic assistance device incorporating a casing enclosing first and second sliding components arranged in line, the first component being capable of being displaced under the effect of the displacement of a pushrod and the second component being capable of being displaced through the intermediary of a hydrostatic connection, and associated with each component is a valve means in a respective hydraulic circuit between

a source of fluid under pressure and a respective braking circuit, characterized in that the first and second components each constitute a piston sliding in a bore in the casing and enclosing first and second valve assemblies each controlled by a plunger, the plunger of the first valve assembly being actuated by a pushrod, and the plunger of the second valve assembly being actuated by the hydrostatic connection between the two pistons.

4,709,551

PRESSURE CYLINDER AND METHOD OF ADJUSTING IDLE TRAVEL

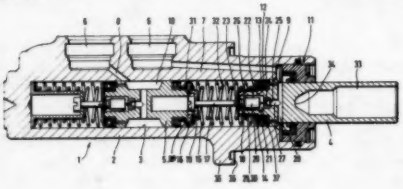
Kurt Saalbach, Walldorf, and Willi Hartmann, Riedstadt, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Dec. 17, 1985, Ser. No. 810,020

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1984, 3446005

Int. Cl.[4] B60T *11/28*

U.S. Cl. 60—589 **1 Claim**



1. A method of adjusting the idle travel of a pressure cylinder used in a hydraulic actuating system of an automotive vehicle, of the type including an abutment face on a flanged provided on a cylinder casing and serving to fasten the pressure cylinder to a wall, a piston in a bore in the cylinder casing, said piston presenting a pressure surface to receive a force applying member and guiding within the bore a central valve with a length adjustable tension element pretensioned by a captive spring arrangement, said tension element adapted to untension upon slidable movement of said piston, said spring arrangement taking support through a support face provided at a spring retainer on a stop, said central valve thereupon interrupting a connection from a pressure chamber on one side of said piston to an intake chamber arranged on another side of said piston, comprising the steps: measuring the distance between said stop and the abutment face; and adjusting the length of the tension element to space the support face from the pressure surface an amount corresponding to the sum of the measured distance and a predetermined functional distance desired between said abutment face and said pressure surface.

4,709,552

MULTIPLE CYLINDER INTERNAL COMBUSTION ENGINE WITH EXHAUST TURBOCHARGERS

Erwin Rutschmann, Bad Herrenalb; Khanh Tran-Van, Weissach, and Joachim Wagner, Stuttgart, all of Fed. Rep. of Germany, assignors to Dr.Ing.h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 737,212, May 23, 1985, abandoned. This application Jan. 30, 1987, Ser. No. 9,571

Claims priority, application Fed. Rep. of Germany, May 29, 1984, 3420015

Int. Cl.[4] F02B *37/12*

U.S. Cl. 60—600 **5 Claims**

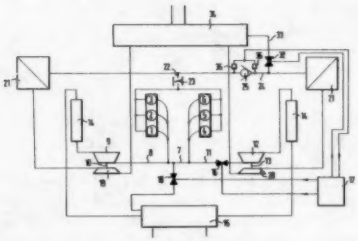
1. An internal combustion engine having cylinder means in fluid communication with common manifold exhaust means, comprising:

first and second turbusupercharging means in fluid communication with said common manifold exhaust means,

common manifold suction means for receiving compressed air from said first and second turbosupercharging means and supplying said compressed air to said cylinder means,

cut-in valve means interposed between said common manifold exhaust means and said second turbosupercharging means for controlling a flow of exhaust to said second turbosupercharging means, said cut-in valve means being responsive to an operating paramater of said engine,

non-return valve means interposed between said second turbosupercharging means and said common manifold suction means for controlling a flow of compressed air from said second turbosupercharging means to said common manifold suction means, said non-return valve means being operably responsive to a pressure build-up upstream of said non-return valve means,



ventilation valve means upstream of said non-return valve means for venting at least a portion of said compressed air,

pressure sensor means upstream and downstream of said non-return valve means for measuring a pressure differential across said non-return valve means, and

control device means connected to said pressure sensors and said ventilation valve means for closing said ventilation valve means when said pressure differential decreases below a preselected pressure valve, thereby permitting said compressed air to open said non-return valve means and pass through said common manifold suction means to said cylinder means.

4,709,553

METHOD OF AND APPARATUS FOR CONTROLLING SUPERCHARGE PRESSURE FOR A TURBOCHARGER

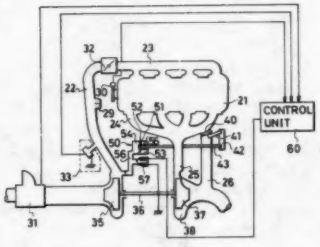
Takashi Ueno, Yokosuka, and Toshimi Abo, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan

Filed Aug. 30, 1985, Ser. No. 771,406

Claims priority, application Japan, Sep. 5, 1984, 59-185633

Int. Cl.[4] F02B *37/12*

U.S. Cl. 60—602 **7 Claims**



1. A method for controlling supercharge pressure of a turbocharger which comprises the steps of:

(a) seeking basic control amount BASE from a look-up table in accordance with an intake air flow rate Qa;

(b) determining whether an acceleration condition is occurring;

(c) if an acceleration condition is determined, calculating a basic control amount BASE' by adding an acceleration increment X to the basic control amount BASE and calculating a target supercharge pressure P'set by adding an acceleration increment Pup to a preset supercharge pressure Pset, and if no acceleration condition is determined, calculating said basic control amount BASE' and said target supercharge pressure P'set without said acceleration increments;

(d) determining if an actual supercharge pressure P2 is equal to or greater than a predetermined pressure value P2fb;

(e) if the actual supercharge pressure P2 is equal to or greater than P2fb, calculating the deviation $\Delta P = P'set - P2$ between the target supercharge pressure P'set and the actual supercharge pressure P2, and calculating a correction amount Xfb to be fed back based on the deviation ΔP, and if the actual supercharge pressure P2 is smaller than P2fb, setting the correction amount Xfb to zero;

(f) producing a duty value by adding the correction amount Xfb to the basic control amount BASE'; and

(g) outputting a control signal based on said duty value to an electromagnetic valve for controlling the supercharge pressure.

5. An apparatus for controlling supercharged pressure of a turbocharger comprising:

operational state detecting means for detecting operational conditions of an engine connected to said turbocharger;

basic control amount calculating means for calculating a basic control amount based on said detected operating conditions;

acceleration determining means for determining based on said detected operational conditions whether said engine is experiencing an acceleration condition;

acceleration increment calculating means for calculating an acceleration increment based on the output of said acceleration determining means in accordance with said basic control amount from said basic control amount calculating means;

target supercharge pressure setting means for setting a target supercharge pressure higher than a normal supercharge pressure when said acceleration determining means determines that said engine is operating in an acceleration condition;

deviation calculating means for calculating a deviation between the target supercharge pressure set by the target supercharge pressure setting means and an actual supercharge pressure detected by the operational state detecting means;

correction amount calculating means for calculating a correction amount of feedback control of the supercharge pressure based on the deviation calculated by the deviation calculating means;

control amount correction means for correcting the basic control amount from the basic control amount calculating means based on the correction amount from the correction amount calculating means; and

control means for controlling exhaust gas flow of said engine based on the basic control amount corrected by the control amount correction means to perform feedback control of the supercharge pressure.

4,709,554

AIR CONDITIONING APPARATUS

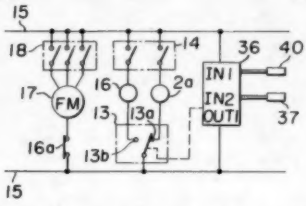
Hiroyuki Umemura; Kenji Matsuda; Tomofumi Tezuka; Kazuaki Isono; Hidenori Ishioka, all of Shizuoka; Fumio Matsuoka, Kamakura, and Hitoshi Iijima, Amagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1986, Ser. No. 898,492

Claims priority, application Japan, Aug. 22, 1985, 60-184901; Aug. 22, 1985, 60-184904; Aug. 22, 1985, 60-184905; Oct. 15, 1985, 60-229074; Nov. 28, 1985, 60-267825; Nov. 28, 1985, 60-267826

Int. Cl.[4] F25D *21/06*

U.S. Cl. 62—156 **7 Claims**



1. An air conditioning apparatus comprising a refrigerant circuit in which a compressor is connected to a four-way valve, and the four-way valve is connected by pipe lines in a circuit including a room side heat exchanger, a pressure-reducing device and an outdoor side heat exchanger connected in that order, further comprising:

a refrigerant temperature detector provided at a pipe line near said outdoor side heat exchanger, a room temperature detector for detecting temperature of a room, and a controlling device which is electrically connected to said refrigerant temperature detector and said room temperature detector and which controls operations for room-warming and defrosting of the outdoor side heat exchanger based on inputs from said detectors;

wherein said controlling device includes a timer and outputs a signal to change the room-warming operation to the defrosting operation and vice versa and compares a room temperature at the time of starting the defrosting operation with a room temperature at a predetermined time after the start of the defrosting operation to detect a value of reduction in the room temperature thereby to determine a defrost prohibiting time which is maximum amount of time during which defrosting of the outside heat exchanger is to occur;

wherein said controlling device varies the defrosting prohibiting time based on a value of reduction in room temperature between a defrosting initiation time and defrosting ending time.

4,709,555

VARIABLE DELIVERY REFRIGERANT COMPRESSOR OF DOUBLE-ACTING SWASH PLATE TYPE

Katsunori Kawai; Hisao Kobayashi; Hiroyuki Deguchi, and Shuichi Sugizono, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Jun. 27, 1986, Ser. No. 879,345

Claims priority, application Japan, Jul. 2, 1985, 60-145399

Int. Cl.[4] F25B *1/00, 41/00*

U.S. Cl. 62—228.3 **6 Claims**

1. A refrigerant gas compressor of the double-acting swash plate type connected in an air conditioning system including an evaporator connected to the suction side of said compressor, comprising;

a cylinder block having formed therein a crankcase, and at least one cylinder bore which receives therein a slidable doubleacting piston;

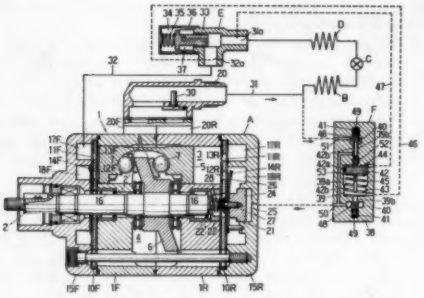
a swash plate driven mechanism in said crankcase and cylinder bore, said mechanism comprising a swash plate ro-

tated by a drive shaft for producing reciprocal sliding movement of said piston, whereby respective compression chambers are formed alternately on opposite sides of said cylinder bore by the reciprocal movement of said piston;

a housing clamped to each end of said cylinder block with a valve plate interposed therebetween, each said housing having formed therein a suction chamber and a discharge chamber each of which chambers is communicable with an adjacent compression chamber through a suction port and a discharge port, respectively, formed through their said associated valve plate, the discharge chamber adjacent to one end of said cylinder block being communicable with the suction chamber adjacent thereto by passage means through said crankcase including a by-pass port formed through said valve plate;

means disposed in the connection line between the outlet of said evaporator and the suction side of said compressor for throttling the refrigerant gas passing therethrough in such a way that its throttling effect is increased with a decrease of evaporator pressure of refrigerant gas on the upstream side of said throttling means with respect to the flow of refrigerant gas so that the suction pressure prevailing on the downstream side of said throttling means is decreased relative to said evaporator pressure in response to an increase of the throttling effect of said throttling means;

a pressure responsive member disposed adjacent to the discharge chamber formed adjacent to said one end of the



cylinder block and movable between a first position thereof wherein normal compression of refrigerant gas in said compression chamber is effected, and a second position thereof wherein refrigerant gas displaced by the piston is by-passed into said crankcase through said by-pass port whereby compression of refrigerant gas in said compression chamber is rendered ineffective, said compressor being thereby operable selectively substantially between its 100% delivery capacity when said pressure responsive member is in its said first position and its 50% delivery capacity when said pressure responsive member is in its said second position;

control means connected to said pressure responsive member for controlling its movement between its said first and second positions selectively in response to a varying of the pressure differential between the discharge pressure at said evaporator outlet and the suction pressure at said suction side of said compressor;

said control means including first valve means actuatable for establishing a communication passage of refrigerant gas under discharge pressure of the compressor for moving said pressure responsive member to said first position, second valve means actuatable for establishing a communication passage of refrigerant gas under said suction pressure of the compressor for moving said member to said second position, and means for selectively actuating said first and second valve means in response to a varying of the pressure differential between said evaporator discharge pressure and said compressor suction pressure.

4,709,556

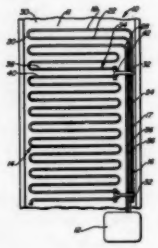
HEAT EXCHANGER TUBE RETAINER FOR A REFRIGERATOR CONDENSER

Ronald K. Hupfer, Knight Township, Vanderburgh County, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Nov. 17, 1986, Ser. No. 931,624

Int. Cl.[4] F25D *19/00*; F16L *3/22*

U.S. Cl. 62—298 **18 Claims**



1. In a refrigeration apparatus having fluid conducting tube means including first and second spaced side by side portions and a third portion extending transversely to said first and second portions, the axes of said tube means portions defining a common plane, means for rigidifying the tube means comprising:

retaining means defining a pair of outwardly oppositely opening seats spaced apart a distance substantially equal to the spacing between said first and second tube means portions, said first and second tube means portions being received one each in said seats to be constrained thereby against relative movement angularly to said common plane and movement toward each other; and

securing means associated with said retaining means and removably secured to said third tube means portion for preventing movement of said retaining means toward and from said third tube means portion.

4,709,557

METHOD AND SYSTEM FOR COOLING STRIP

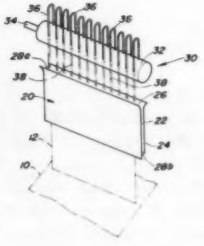
Akio Tosaka; Koichi Hashiguchi; Masahiko Morita, and Shinobu Okano, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Feb. 3, 1987, Ser. No. 10,496

Claims priority, application Japan, Feb. 4, 1986, 61-21102; Feb. 4, 1986, 61-21103; Nov. 7, 1986, 61-17033[U]; Nov. 7, 1986, 61-170334[U]

Int. Cl.[4] F25D *17/02*

U.S. Cl. 62—373 **45 Claims**



1. A strip colling system comprising:

a laminar flow nozzle constituted of a pair of first and second plates arranged in side-by-side relationship to each other for defining therebetween a fluid path of a cooling fluid for establishing a slit laminar flow substantially perpendicular to a strip path, through which the strip is transferred, said first plate being displaceable relative to said second plate for varying the path area of said fluid path;

a cooling fluid supply means for supplying controlled amount of cooling fluid to flow through said fluid, path; and

said first plate being responsive to fluid pressure within said fluid path, for causing displacement relative to said second plate at a magnitude corresponding to said fluid pressure.

4,709,558

ADSORPTION REFRIGERATING APPARATUS

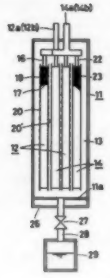
Masao Matsushita, Osaka; Kenzo Oku, Kyoto; Hiroki Nakano, Hirakata, and Shin-ichi Okumura, Ootsu, all of Japan, assignors to Nishiyodo Air Conditioner Co., Ltd., Osaka, Japan

Filed Sep. 12, 1986, Ser. No. 907,201

Claims priority, application Japan, Jan. 28, 1986, 61-017326

Int. Cl.[4] F25B *17/08*

U.S. Cl. 62—480 **24 Claims**



1. An adsorption refrigerating apparatus, comprising:

a vessel substantially evacuated of air and having a refrigerant filled hermetically therein;

a first finned tube heat exchanger housed in said vessel, through which first finned tube a first heat transfer medium on a heat source side is adapted to flow, said first finned tube having plural axially spaced fins between each of which is an interstice;

a particulate adsorbent packed and held in the plural interstices of said first finned tube, said adsorbent forming contiguous voids among the particles thereof and adapted to allow refrigerant vapors to flow readily through said voids thereby to bring the vapors into good contact with the particles; and

a second finned tube heat exchanger housed in said vessel, through which second finned tube a second heat transfer medium on a utilization side is adapted to flow, said second finned tube having plural axially spaced fins serving as a vaporizer and condenser;

said first finned tube having an overall dimension smaller than an inside dimension of said vessel so as to leave a free space therebetween, said space allowing the refrigerant vapors to move freely about.

4,709,559

COOLING SYSTEM FOR RELATIVELY MOVABLE COMPONENTS

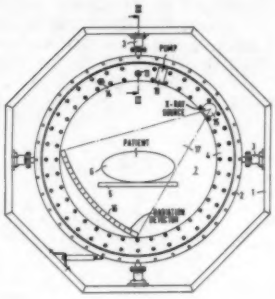
Peter Dotzauer, Buckenhof, and Martin Schmidt, Emskirchen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 20, 1986, Ser. No. 876,752

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1985, 3527657

Int. Cl.[4] F25B *3/00*

U.S. Cl. 62—499 **2 Claims**



1. A cooling system for an apparatus having a stationary part and a movable part rotatably mounted with respect to said stationary part comprising:

a sealed channel between said stationary part and said movable part,

an evaporator disposed in said sealed channel disposed between the stationary part and the movable part;

a cooling device connected with said evaporator;

a closed cooling circulation path on said movable part including said channel;

coolant filling said closed cooling circulation path; and

a pump for circulating said coolant in said closed circulation path.

4,709,560

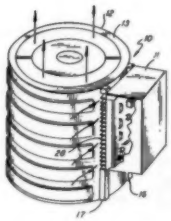
CONTROL MODULE COOLING

Roger Voorhis, Liverpool; Daryl G. Erbs, Canastota; John M. Palmer, Syracuse, and Derrick A. Marris, Blossvale, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Dec. 4, 1986, Ser. No. 938,105

Int. Cl.[4] F25B *39/04*

U.S. Cl. 62—508 **7 Claims**



1. In an air conditioning system of the type having a heat exchanger coil structure with an internal fan for causing the cooling air to flow radially inwardly through a coil, an improved power module comprising:

a control box containing electrical components for controlling the system, said control box being mounted to and supported by said outdoor coil structure; and

a heat sink associated with said control box, said heat sink having said electrical components mounted thereon so as to give up their generated heat to said heat sink, and said heat sink further being located in the flow path of the cooling air, between said control box and said outdoor coil structure, such that a portion of cooling air passing thru said coil, first passes over said heat sink to thereby enhance the cooling thereof.

4,709,561

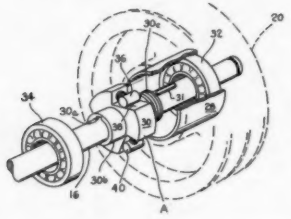
APPARATUS AND METHOD FOR IMPROVING DRIVE FOR A CIRCULAR KNITTING MACHINE TO REDUCE WEAR AND GEAR BREAKAGE

William I. Blackerby, P.O. Box 4111, Anderson, S.C. 29622

Filed Sep. 24, 1986, Ser. No. 911,170

Int. Cl.[4] D04B *15/94*

U.S. Cl. 66—8 **16 Claims**



1. Apparatus for converting the drive of a circular hose knitting machine to reduce wear and gear breakage, said circular hose knitting machine being of the type having a needle cylinder carrying a plurality of knitting needles, a beveled cylinder gear connected to said needle cylinder, a beveled cylinder drive gear affixed to a drive shaft meshing with said beveled gear of said knitting cylinder for revolving said knitting cylinder to effect a knitting motion of said knitting needles; an input drive sheave coupled to said drive shaft; and a clutch assembly coupling said input drive sheave and said drive shaft which includes an inner bearing race affixed to said drive shaft, an outer bearing race affixed to said input drive sheave, and an S-sprag clutch carried between said inner and outer races having a plurality of S-formed sprags which engage said inner and outer races to effect a drive engaging connection between said input drive sheave and said drive shaft when said input sheave is driven in rotation while permitting free rotation of said drive shaft when said input drive shaft is not driven in rotation wherein said apparatus comprises:

(a) a clutch unit directly affixed to said drive shaft adapted for replacing said inner bearing race and said S-sprag clutch, said clutch unit having a clutch body with a plurality of evenly spaced recesses formed in the outer periphery of said clutch body and each of said recesses having one flat surface inclined towards said periphery and said clutch unit having an extension on each side of said clutch body;

(b) said outer bearing race connected to the inner surface of said hollow sheave and having a smooth, even surface surrounding said clutch body;

(c) a plurality of locking members, one disposed in each of said recesses;

(d) biasing means for independently urging each of said locking members outwardly of its recess in a manner that said locking members move outwardly into wedging contact between the inclined flat surface of said recess and the outer race so that when said sheave is rotated in one direction said members will be wedged more tightly into driving contact with the outer race and the inclined flat surface and out of wedging contact with the outer race when said sheave is rotated in the opposite direction;

(e) bearings supported by each of the extensions of said clutch body and engaging said outer bearing race for supporting said input sleeve for rotation relative to said clutch unit; and

(f) means disposed on one of said extensions for facilitating the removal of said clutch unit from said drive shaft.

4,709,562

WARP-KNIT SUPPORT TAPE FOR HOOK AND LOOP FASTENERS

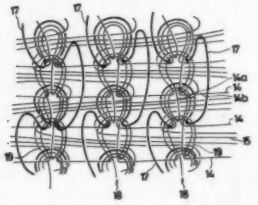
Yoshio Matsuda, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Oct. 23, 1986, Ser. No. 922,166

Claims priority, application Japan, Oct. 23, 1985, 60-162742[U]

Int. Cl.[4] D04B *7/12*

U.S. Cl. 66—193 **5 Claims**



1. A warp-knit support tape for hook and loop fasteners which comprises a pile portion constructed with two needle stitches, laid-in weft threads and chain stitches formed by sinker looping into pile-loops, said pile-loops extending longitudinally of the tape alternately along the right and left sides of wales.

4,709,563

NEEDLE-SELECTING SYSTEM FOR CIRCULAR KNITTING MACHINE

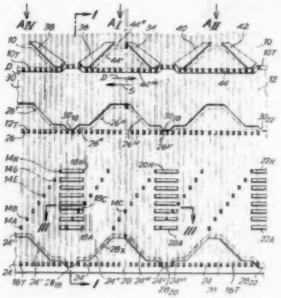
Leonardo Camiciotti, and Edoardo Furia, both of Florence, Italy, assignors to Novitex s.r.l., Florence, Italy

Filed Feb. 12, 1986, Ser. No. 828,968

Claims priority, application Italy, Feb. 15, 1985, 9336 A/85

Int. Cl.[4] D04B *9/36, 15/68*

U.S. Cl. 66—222 **1 Claim**



1. A circular knitting machine for the production of articles having an argyle or mosaic pattern, comprising a needle cylinder mounted for reciprocatory rotary motion and having latch needles, intermediate jacks and selection jacks provided with selection butts with which stacked arrays of selection levers cooperate, the latter being disposed to select the needles to be raised to knit by depressing said selection jacks, the latter being

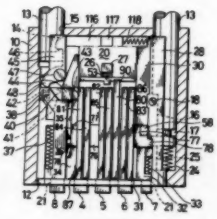
associated with elastic pusher jacks having respective butts; a bottom cam ring having lifting profiles arranged to cooperate with said pusher jacks; and a top cam ring having profiles arranged to cooperate with said intermediate jacks; wherein a stacked array of selection levers is disposed centered circumferentially between adjacent yarn feeding stations for selecting the needles to clear and knit in one or the other of said adjacent feeding stations depending upon the direction of said reciprocatory motion, said lifting profiles of said bottom cam ring being substantially symmetrically located with respect to said feeding stations and to said stacked arrays of selection levers, said profiles of said top cam ring being similarly symmetrically located for controlling and lowering said intermediate jacks, said profiles of said bottom cam ring having, in alignment with said selection levers, V-notched profiles with a bottom slightly lower than the lower dwell path of said butts of said elastic pusher jacks, while corresponding lower projections are provided on said top cam ring for the control and lowering of said intermediate jacks; the width of said V-notched profiles being less than that of said selection levers to obtain by elasticity the engagement and subsequent lifting of said butts of said pusher jacks on said lifting profiles, whenever one selection lever does not depress the relative corresponding butt of the selection jack, and the butt of said elastic pusher jack enters said V-notched profile and engages said lifting profile, in order to obtain said selection of said needles.

4,709,564

DIGITAL LOCK

Saburo Minami, Osaka, Japan, assignor to Osaka Kanagu Co., Ltd., Osaka, Japan

Filed Nov. 15, 1985, Ser. No. 798,682
Int. Cl.[4] E05B *37/18*
U.S. Cl. 70—25 **1 Claim**



1. A digital lock having a case, a locking rod lockable within said case, a plate-like lock member and a front plate covering said lock member disposed in said case, a plurality of push-buttons, a return button and an opening button, and digital lock means comprising:

a. a stop piece provided adjacent a forward end of a leg piece of said opening button and movable between a first position for preventing movement of said leg piece and a second position for allowing movement of said leg piece;

b. a locking piece for locking and releasing said locking rod within said case having a protruding piece thereof engaged with a top end of said leg piece of said opening button;

c. a slidable plate disposed between said lock member and said front plate and vertically movable and having a lock plate fitted thereto;

d. a notch in said slidable plate for receiving therein a forward end of said stop piece when said slidable plate and said lock plate are moved vertically by a specified length;

e. a return link provided along the lower edge portion of the lock plate and pivotably mounted by sling pieces having support axes at both ends thereof;

f. a spring piece inserted in a cut-out surface of said front plate for pressing one of said sling pieces against a leg piece of said return button;

g. pawl pieces arranged in front of said lock plate opposite said slidable plate, said return link extending between said pawl pieces and said lock plate, and a comb-teeth shaped spring piece mounted at the surface of said front plate facing said lock member for pressing said pawls against said lock plate;

h. a lock pawl having a protruding piece at its base end fitted loosely in the central lower part of said lock member;

i. a protruding piece at the base end of each of said pawl pieces loosely fitted in a recess of said push-buttons and pawl tips on the forward end of each of said pawl pieces pressed against said lock plate;

j. said lock plate having holes for receiving said pawl tips;

k. said lock plate and said slidable plate being movable by a pitch length each time a push-button is pushed and when the push-buttons are pushed in a correct order;

l. said leg piece of said opening button being movable to an open position when said stop piece is moved to said second position and said forward end enters said notch of said slidable plate after said slidable plate is moved vertically by said specified length;

m. said locking piece being disengaged from said locking rod by said top end of said opening button when said opening button is moved to said opening position whereby unlocking is rendered possible;

n. square recesses in the upper part and the intermediate part of the front surface of said front plate facing away from said lock member, a first groove in the upper part of said front plate open to said square recesses;

o. an engaging plate in said recesses of said front plate being pressed downwards by a spring and leaving a gap corresponding to one said pitch length between the upper edge of said engaging plate and an upper edge of said recesses;

p. a protrusion on the upper edge of the rear surface of said engaging plate fitted in a groove in said recesses of said front plate;

q. a square hole in the substantially upper half of said engaging plate having an intermediate piece loosely fitted thereto;

r. the lower edge of said intermediate piece located in said recesses of said front plate;

s. the front surface of the intermediate piece being pressed by a spring piece fitted to the engaging plate for positioning the lower edge of said intermediate piece at the rear side of said front plate;

t. a top edge of each of said pawl pieces positioned adjacent the lower edge of said intermediate piece, said lower edge positioned adjacent a side of a key-shaped piece of a top end of said lock pawl;

u. said front plate having a second groove in its upper surface open to and communicating with said first groove in said recesses of said front plate, an engaging key and a push spring located in said second groove;

v. said engaging key having one end pressed against the rear surface of said locking piece,

whereby when a push-button is pushed out of said correct order an upper end of the respective pawl piece moves said engaging plate from a first position to an unlocking prevention position via said intermediate piece, and the key-shape piece of said lock pawl is moved to maintain the engaging plate at said unlocking prevention position, and when said return button is pushed the return link disengages said lock pawl from said intermediate piece and said engaging plate is returned to said first position.

4,709,565

UNITED OPENING DEVICE FOR A DOUBLE-LOCKED DOOR

Jui C. Lin, 297, Bor Ay Rd., Kaohsiung City, Taiwan (800)

Filed Oct. 28, 1986, Ser. No. 923,869
Int. Cl.[4] E05B *59/00*
U.S. Cl. 70—107 **2 Claims**

1. In an opening device for simultaneously opening two

locks on a double-locked door including a main lock operated by a rotatable main shaft, an auxiliary lock operated by a rotatable shaft spaced from the main lock shaft, a main cam member operatively engaged with the main lock shaft to be rotated thereby, a sliding linking plate having main cam followers thereon engageable with the main cam member so that rotation of the main cam member reciprocally displaces the linking plate, auxiliary camming members on the linking plate, an auxiliary lock operated by a rotatable auxiliary shaft, and an auxiliary cam follower on the auxiliary shaft for rotation therewith and operatively engageable with the auxiliary camming members, so that when the auxiliary lock is in the locked position the auxiliary cam followers engage one of the auxiliary camming members and displacement of the linking plate by unlocking rotation of the main shaft simultaneously unlocks the auxiliary lock by displacement of one of the auxiliary camming members which rotates the auxiliary cam follower, the improvement comprising:

two substantially straight slots in the linking plate;

a hooking hole at one end of each slot;

the main cam followers and auxiliary camming members being hook members projecting from opposite ends of the linking plate;

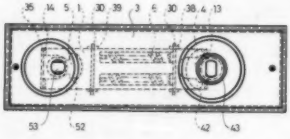
a bottom plate having two slots therein aligned with said slots in the linking plate;

two shaft holes in said bottom plate for receiving the main and auxiliary shafts, respectively;

a plurality of screw holes in said bottom plate for use in attaching said bottom plate to a door;

a surface plate attachable to said bottom plate;

means for attaching said surface plate to said bottom plate;



two offset concave disc sections on said surface plate having two shaft holes therethrough aligned with said two shaft holes in said bottom plate for receiving the main and auxiliary shafts, respectively;

two hooking holes on the interior surface of said surface plate facing said bottom plate;

tension springs in said slots connected at opposite ends thereof to said linking member hooking holes and said surface plate hooking holes, respectively;

a spacing edge wall around the periphery of said surface plate for spacing said surface plate from said bottom plate;

guide members projecting from the interior surface of said surface plate for guiding the linking plate to move in a substantially straight line;

retaining bars attachable to said guide members in spaced relationship and slidingly engaging the surface of the linking plate facing said bottom plate for retaining the linking plate for sliding movement on said surface plate;

the auxiliary cam follower being an auxiliary disc member having oppositely extending cam follower elements therein engageable adjacent the outer ends thereof with the auxiliary camming members when said auxiliary shaft is in the locking position and disengaged from the auxiliary camming members when in the unlocked position; and

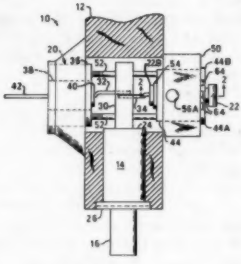
a stop member projecting inwardly from said offset concave disc section adjacent the position of the auxiliary shaft for limiting sliding movement of the linking plate in the non-operating retracted position under the resilient force of said tension springs.

4,709,566

SINGLE CYLINDER DEADBOLT LOCK MECHANISM

Carl H. Wildenradt, 2358 - 35th Ave., San Francisco, Calif. 94116

Filed Nov. 6, 1986, Ser. No. 927,517
Int. Cl.[4] E05B 65/6
U.S. Cl. 70—129 **9 Claims**



1. A lock mechanism comprising,

a key operated lock cylinder at one side thereof,

a turn piece at the opposite side thereof,

a latch bolt operated by rotation of said cylinder by a key and by rotation of said turn piece,

lost-motion connections between said latch bolt and cylinder and between said latch bolt and turn piece to allow for independent operation of said latch bolt by either said cylinder or turn piece,

manually movable means operable from said opposite side of the lock mechanism and movable between a first position for preventing operation of the latch bolt by said turn piece and a second position allowing for operation of the latch bolt by the turn piece, and

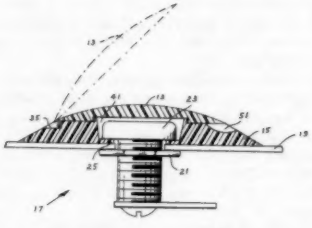
locking means operable from said opposite side of the lock mechanism for locking the manually movable means in said first position.

4,709,567

LOCK AND COVER DEVICE

Paul Appelbaum, 5115 E. Donald St., Denver, Colo. 80222

Filed May 30, 1985, Ser. No. 739,227
Int. Cl.[4] E05B 17/18
U.S. Cl. 70—455 **9 Claims**



1. Apparatus to be mounted to a lock for releasably sealing a lock and having a keyway sealing position and an keyway exposing position, comprising:

a. resilient polymeric housing, circular in planform and having a flat annular bottom surface, said housing having a central bore extending therethrough for admitting the cylinder of said lock, the upper surface of said housing having an upwardly sloping outer portion, an intermediate flat annular portion, and a central portion sunken substantially below the plane of said intermediate portion and having a generally annular flange at the bottom of said

sunken portion, bordering said central bore, and a resilient annular male locking lip extending upwardly and somewhat radially outwardly from said intermediate annular portion, and means within said sloping portion for receiving the posts of a hinge joint;

b. a resilient polymeric lid, circular in planform and having a convex upper surface and a diameter the same as the outer circular boundary of said housing intermediate portion, the bottom of said lid being flat with a central circular depression therein that has a diameter somewhat larger than said male locking lip, and the side wall of said depression having a continuous, radially inwardly extending flange defining an inner circle that is slightly smaller in diameter than the outer diameter of said male lip, and means depending from the periphery of said lid for carrying posts receivable within said post receiving means on said housing whereby said lid is pivotally mounted for rotation from an open position to a sealed position wherein the bottom of said lid lies flush with said intermediate housing portion and whereby said female finger is pressed over the male lip to form sealing and locking engagement with the outer wall of said male lip, and whereby a dome-like configuration is provided to the combined top of said apparatus.

4,709,568

LUBRICATION OF ROLLING MILLS

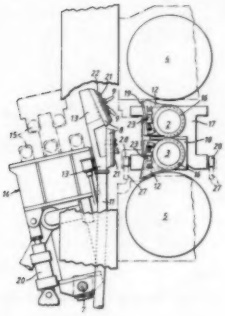
Roy M. Ticehurst, and Joseph L. Watson, both of Bournemouth, England, assignors to Davy McKee (Poole) Limited, Dorset, England

Filed Jun. 10, 1986, Ser. No. 872,394

Claims priority, application United Kingdom, Jun. 10, 1985, 8514599; Jun. 10, 1985, 8514597

Int. Cl.[4] B21B *27/10*

U.S. Cl. 72—201 **11 Claims**



1. A rolling mill comprising

a plurality of mill rolls;

means for directing liquid coolant onto the rolls at the ingoing side of the mill;

one or more backing supports on which are mounted the coolant directing means;

a casing or casings which during operation enclose the coolant directing means and have contact seals which engage the rolls to prevent unwanted egress of coolant from the casing or casings onto work entering the mill;

sealing means between the casing or casings and the backing support or supports; and

mounting means for the casing or casings for withdrawal of the casing or casings from the mill for maintenance purposes independently of said one or more backing supports.

4,709,569

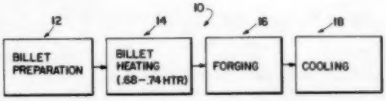
METHOD FOR PRODUCING GEARS

Alvin M. Sabroff, Mentor, Ohio; Samuel C. Chambers, and James C. Ream, both of Glasgow, Ky., assignors to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 238,255, Feb. 25, 1981, abandoned. This application May 2, 1983, Ser. No. 484,800

Int. Cl.[4] B21J *1/06*

U.S. Cl. 72—340 **3 Claims**



1. A method of producing a spur or bevel gear of low to medium carbon level carbon or allow steel comprising the steps of:

(a) providing a properly sized, shaped and cleaned billet of a given low to medium carbon level carbond or ally steel having a carbon content of not more than 0.30%;

(b) heating the billet in a minimum oxidizing environment to a preselected temperature falling in the range of 0.069–0.71 for the homologous temperature ratio of the billet material;

(c) locating the heated billet in a first die member on a forging machine;

(d) precision forging the billet while substantially at said preselected temerature by engaging the heated billet with a second die member complementary with the first die member in a single forge flow to form a gear precision preform;

(e) removing the preform and allowing the preform to cool in air to substantially ambient temperature; and

(f) machining less than 0.060 inch of material from the exterior functional surfaces of the cooled preform without subjecting the cooled preform to any heat treating operation prior to said machining.

4,709,570

METHOD FOR SETTING STEEL STOCK DISCHARGE TEMPERATURE OF HEATING FURNACE IN HOT ROLLING LINE

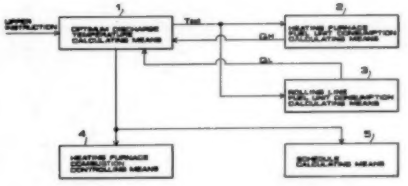
Yoshinori Wakamiya, and Tomoko Sumino, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 6, 1985, Ser. No. 795,326

Claims priority, application Japan, Nov. 7, 1984, 59-236429

Int. Cl.[4] B21B *1/22, 37/10*

U.S. Cl. 72—365 **1 Claim**



1. A method for setting a steel stock discharge temperature of a heating furnace in a hot rolling line, comprising the steps of:

(a) determining a fuel unit consumption in the heating furnace by a heating furnace fuel unit consumption calculating means employing the equation

$$Q_H = f(H, T_{in}, T_{out}, T_G, \Delta t)$$

where,
H: plate thickness in the heat furnace (mm)
T_{in}: charging temperature (° C.)
T_{out}: discharge temperature (° C.)
T_G: intra-furnace atmosphere temperature (° C.)
Δt: intra-furnace residence time (hour);

(b) determining a fuel unit consumption in a rolling line by a rolling line fuel unit consumption calculating means employing the equation

$$Q_L = g\,(H,\ T_{out},\ h,\ T_D)$$

where,
h: final plate thickness (mm)
T_D: finishing discharge temperature (° C.)

(c) determining a total fuel unit consumption Q ($Q = Q_H + Q_L$) in the entire line from said fuel unit consumption in the heating furnace and said fuel unit consumption in the rolling line with T_{out} and T_G as variables; and

(d) substituting present state T_G as value of T_G in the equation for Q;

(e) determining an optimum discharge temperature so as to satisfy a metallurgical discharge temperature restrictive condition and minimize said total fuel unit consumption, according to a non-linear equation optimizing processing, by an optimum discharge temperature calculating means, said optimum discharge temperature calculating means performing the steps of:

(1) determining T_{out} value for minimizing Q;

(2) substituting T_{out} value so determined in first equation above to determine intra-furnace atmosphere temperature T_G';

(3) determining whether $T_G - T_G' < \epsilon$, where ε is an arbitrary positive number;

(4) if equation in step (3) is not satisfied, substituting T_G' for T_G and repeating steps (1), (2) and (3) until equation in step (3) is satisified and

(f) using said optimum discharge temperature as the steel stock discharge temperature.

4,709,571

METHOD OF OPERATING A CONTROLLED DEFLECTION ROLL AND A ROLLING MILL EQUIPPED WITH AT LEAST ONE CONTROLLED DEFLECTION ROLL

Heinz Güttinger, Schaffhausen, Switzerland, assignor to Sulzer-Escher Wyss AG, Winterthur, Switzerland

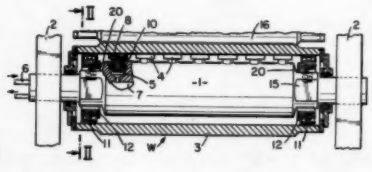
Division of Ser. No. 408,694, Aug. 16, 1982, Pat. No. 4,620,348. This application Feb. 19, 1986, Ser. No. 830,766

Claims priority, application Switzerland, Sep. 21, 1981, 6072/81

The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.

Int. Cl.[4] B21B *31/32*

U.S. Cl. 72—366 **17 Claims**



13. A method of operating a rolling mill having a pair of controlled deflection rolls, comprising the steps of:

operating carrier members for compensating the weight of a roll shell of each controlled deflection roll of said pair of controlled deflection rolls and the weight of components carried by said roll shells within a respective predetermined mobility range of each said roll shell;

regulating said carrier members such that said weights are substantially exactly compensated; and

operating and regulating pressure elements of each said controlled deflection roll for providing a predetermined degree and distribution of pressing force across the width of said pair of controlled deflection rolls independently of said weights.

4,709,572

METHOD OF PROCESSING CONTINUOUSLY CAST SLABS

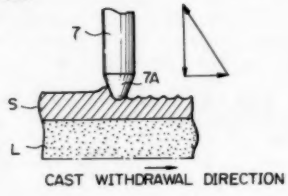
Tsuneo Yamada, Nishinomiya; Tsutomu Sakashita, Ibaraki; Hiroshi Tomono; Takashi Kimura, both of Osaka; Yasuhiro Maehara, and Kunio Yasumoto, both of Kobe, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

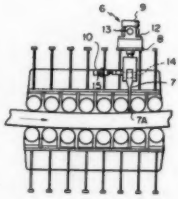
Filed Jul. 30, 1985, Ser. No. 760,453

Claims priority, application Japan, Jul. 31, 1984, 59-161183; Aug. 20, 1984, 59-171439; Aug. 20, 1984, 59-171440

Int. Cl.[4] B21B *1/46, 11/00*; C21D *8/00*

U.S. Cl. 72—366 **8 Claims**





1. A method of processing a cotinuously cast slab to prevent the formation of surface cracks by applying plastic strais to the upper surface layer of the slab in which a process of solidification is taking place, comprising pressing a projection against the slab surface to a depth of 1-5mm at a frequency of at least 50 times per minute prior to introducing the slab to a straightening stage.

5. A method of processing a continuously cast slab, characterized by imparting plastic strains to a depth of 2 mm or more from the surface in an amount of 5% or more at a strain rate ($\dot{\epsilon}$) given by the following expression:

$$\dot{\epsilon} \geqq a \times \exp(bT)$$

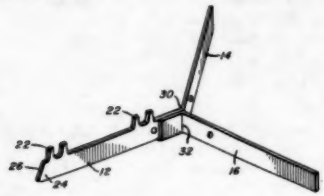
wherein, $a = 4 \times 10^{-5}$, $b = 4.6 \times 10^{-3}$, T is a cast slab surface temperature, and 700° C. ≦ T ≦ 1200° C., then passing the resulting slab through a series of withdrawal rollers and subjecting the slab to straightening.

4,709,573

SURFACE HEATING ELEMENT SUPPORT SPIDER

James E. Philpot, Cookeville, Tenn., assignor to Teledyne Industries Inc., Cookeville, Tenn.

Filed Aug. 29, 1986, Ser. No. 901,615
Int. Cl.[4] B21C *37/02;* B23P *13/00*
U.S. Cl. 72—379 3 Claims



1. A method of making a support spider for a surface heating element utilizing a blank comprising first and second oppositely directed legs and a third leg spaced from and extending substantially parallel to one of the first and second legs and connected to a base area of one of the first and second legs, said method comprising the steps of;

(a) folding the third leg about the first and second legs and into a plane spaced from, overlying, and substantially coextensive with an adjacent one of the first and second legs; and

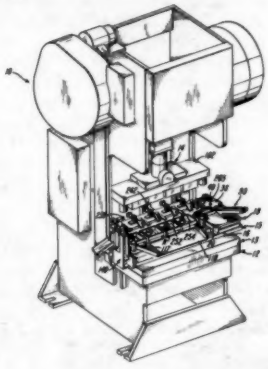
(b) spreading the third leg and the one of the first and second legs adjacent thereto from one another for arranging the first and second legs and the third leg substantially equidistant from one another.

4,709,574

MACHINE FOR COLD FORMING SMALL TUBULAR ELEMENTS

Charles Horn, deceased, late of Dayton (by Dorothy E. Horn, executor), and William R. Jenkins, Dayton, both of Ohio, assignors to Vulcan Tool Company, Dayton, Ohio

Filed Mar. 2, 1984, Ser. No. 585,763
Int. Cl.[4] B21J *13/08;* B21K *1/64*
U.S. Cl. 72—405 8 Claims



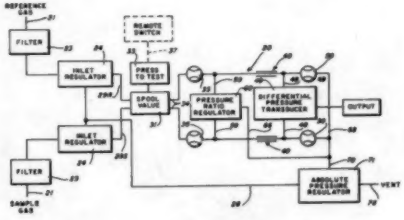
1. Apparatus for converting short lengths of tubing, constituting tubular elements, into nuts, small fitting, sleeves or other tubular or annular fasteners or coupling devices distinguished by utilitarian exterior and/or interior surface portions comprising means defining a plurality of stations, in each of which each tubular elements must be positioned in the course of its conversion, including a receiving station and plurality of following stations at least a portion of which are working stations, means defining said receiving station presenting a horizontally disposed base surface and immediately thereabove, in a plane which is in an adjacent spaced relation thereto, means including laterally spaced elements arranged to closely confine therebetween and establish a mount of a tubular element delivered to said receiving station with one end thereof in abutment with and its longitudinal axis perpendicular to said base surface, said base surface at said receiving station being laterally extended in linear fashion in the direction of the following of said stations, means for the transfer of said tube elements from said receiving station to each of the other said stations in series relation, tooling in essentially coaxial alignment with and in a vertically spaced relation to each said tubular element as it is positioned in a working station, said tooling in each said working station being constructed and arranged to apply endwise and/or, at least in part, along the length and axially of the tubular element aligned therewith to produce a change in the configuration and/or dimension of at least a part thereof while maintaining the original inner dimension of its interior cross-section within at least a portion of its length, said means immediately above and spaced from said base surface of said receiving station including a rotatable wheel constructed and arranged to include a series of equidistantly spaced notches in its outer periphery, each of which notches is bounded by a pair of said laterally spaced elements to form in said wheel a pocket complementary to such of said tubular elements as are delivered to said receiving station, said transfer means including means movable therewith constructed and arranged to serve as the medium for inducing the movement of a tubular elements in said receiving station to the next following station in the process of which to index said wheel to present a succeeding pocket thereof over said base surface to define therewith said receiving station, means being provided to insure the movement of the tubular element from said pocket in said receiving station to said next following station with the length thereof in the same vertical orientation and based on the same level as that on which it was originally positioned in said receiving station.

4,709,575

FLUIDIC OXYGEN SENSOR MONITOR

William P. Myers, Rock Island, Ill., assignor to Litton Systems, Inc., Davenport, Iowa

Filed May 5, 1986, Ser. No. 859,382
Int. Cl.[4] G01N *7/00*
U.S. Cl. 73—23 12 Claims



1. A fluidic sensor for determining the partial pressure of oxygen in a gas comprising:

a positive pressure inlet for a reference gas and a positive pressure inlet for a sample gas,

a capillary passage for the reference gas and a capillary passage for the sample gas,

an orifice passage for the reference gas and an orifice passage for the sample gas,

an outlet for the fluidic sensor at ambient pressure, and

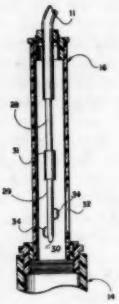
means coupled to the outlets of the capillary passages for detecting a pressure differential between the outlet of the reference capillary passage and the outlet of the sample capillary passage.

4,709,576

LEAK DETECTION METHOD AND APPARATUS

Austin B. Raabe, Alpharetta, Ga., assignor to Applied Biology, Inc., Decatur, Ga.

Filed Oct. 14, 1986, Ser. No. 918,368
Int. Cl.[4] G01M 3/04
U.S. Cl. 73—40.5 R 10 Claims



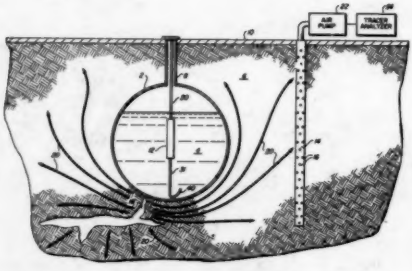
1. Apparatus for detecting the presence of vapor within a well or the like, said apparatus including a housing receivable within said well, conduit means fixed to said housing and in communication therewith, said conduit means extending from said well and having an upper end, volume indicating means connected to said upper end of said conduit means, pump means connected to said volume indicating means for moving air through said housing, said conduit means, and said volume indicating means, and vapor indicating means received within said housing and in communication with said conduit means so that said air must pass through said vapor indicating means.

4,709,577

SYSTEM FOR CONTINUOUSLY MONITORING FOR LEAKS IN UNDERGROUND STORAGE TANKS

Glenn M. Thompson, Tucson, Ariz., assignor to Tracer Research Corporation, Tucson, Ariz.

Filed Nov. 29, 1983, Ser. No. 556,620
Int. Cl.[4] G01M 3/20
U.S. Cl. 73—40.7 12 Claims



1. An apparatus for detecting leaks from at least one subsurface liquid storage tank comprising:

at least one subsurface liquid storage tank containing a quantity of liquid;

means for dispensing a highly detectable tracer into the liquid, wherein said dispensing means includes:

an elongated generally cylindrical container means for storing at least a partial reservoir of liquid tracer and a portion of gaseous tracer and,

an elongated permeation tube means extending downwardly from said container into said at least one subsurface liquid storage tank for diffusing the gaseous tracer through the walls of the permeation tube means for releasing tracer into the liquid in said tank;

at least one subsurface sampling pipe having a plurality of apertures therein for collecting soil gas samples near the proximity of said at least one subsurface liquid storage tank; and

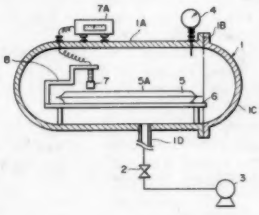
means for analyzing samples of soil gas from said at least one sampling pipe for detecting the presence of said tracer indicative of a liquid leak from said tank.

4,709,578

METHOD AND APPARATUS FOR DETERMINATING A VACUUM DEGREE WITHIN A FLEXIBLE VACUUM PACKAGE

Tadayoshi Iwasaki, Fujisawa; Keiki Ariga, Yokohama, and Makoto Sato, Yokosuka, all of Japan, assignors to Nippon Sanso Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1985, Ser. No. 792,397
Claims priority, application Japan, Oct. 30, 1984, 59-228367
Int. Cl.[4] G01M 3/36
U.S. Cl. 73—49.3 3 Claims



1. A method for determining a vacuum degree within a flexible vacuum package containing a material in a vacuum state, comprising the steps of:

sealingly placing the vacuum package within a vacuum chamber;

evacuating the vacuum chamber to a degree below the vacuum degree of the vacuum package sealingly placed within the vacuum chamber;

detecting a start of displacement of a part of the package during the evacuation step;

measuring pressure within the vacuum chamber when the start of displacement of the part of the package is detected, and

calculating the pressure within said vacuum package based upon the detected start of displacement of the part of the package during the evacuation step and the measured pressure within the chamber.

4,709,579

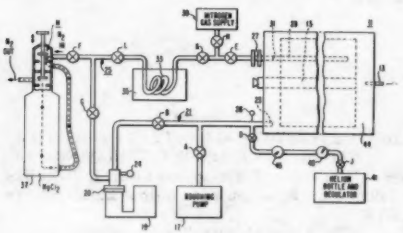
MEASUREMENT OF MOISTURE CONTENT

Merle A. Parker; Richard A. Pregnall, and Hassan J. Ahmed, all of Columbia, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 16, 1985, Ser. No. 766,306
Int. Cl.[4] G01N 5/02
U.S. Cl. 73—76 12 Claims

1. A method of determining moisture content within each of a plurality of nuclear fuel rods, each fuel rod including cladding containing therein a plurality of fuel pellets, the cladding of each fuel rod having an opening for escape of air and vapor of moisture from the interior thereof; said method being practiced with apparatus including a drying oven, evacuating means connected to said oven and to at-least one fuel rod randomly selected from said plurality of fuel rods, for evacuating said oven and said at-least one rod, and moisture-vapor condensing means connected to said at-least one rod through

said evacuating means; said method including heating said fuel rods in said oven to a predetermined temperature for a predetermined interval of time, while said rods are being heated enabling said evacuating means to evacuate said oven and said at-least one rod, collecting said vapor of moisture from said at least one rod, through said evacuating means, in said moisture-vapor condensing means, condensing said vapor from said at-least one rod in said condensing means, thereafter evaporating said moisture from said at-least one rod condensed in said



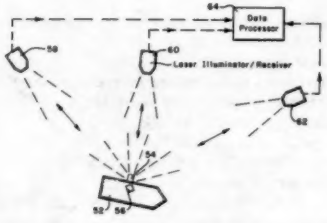
condensing means, and measuring the quantity of moisture which was condensed from said at-least one rod; the interior of said at-least one rod being maintained through its said opening by said evacuating means and said oven at the same pressure as the interior of the remaining plurality of fuel rods are maintained through their respective openings, whereby the measurement of the moisture within said at-least one rod is used as an equivalent measurement of the moisture within each of the remaining plurality of fuel rods.

4,709,580

RETROFLECTIVE ATTITUDE DETERMINING SYSTEM

J. James Butts, Jr., Rolling Hills Estates, and Don R. Howard, Palos Verdes Estates, both of Calif., assignors to bd Systems, Inc., Torrance, Calif.

Filed Feb. 26, 1986, Ser. No. 834,213
Int. Cl.[4] G01C *21/00*
U.S. Cl. 73—178 R **20 Claims**



9. A system for determining the orientation and rate of rotation of a spinning object comprising:

means for mounting at least one retroreflective attitude marker (RAM) having a single predetermined plane of retroreflection on the object under consideration, each said RAM including a plurality of exposed pairs of reflecting surfaces with the surfaces of each pair being oriented at 90 degrees with respect to one-another;

means for directing at least two radiation beams toward said object;

means associated with said radiation beam directing means for receiving retroreflections from said object when and only when said RAM retroreflection plane is aligned with said beam directing means;

means for timing the interval between the occurrence of successive received retroreflections from said RAM; and

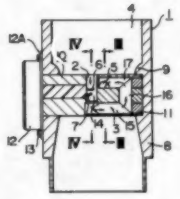
means for calculating the spin rate of said object from said successive retroflections.

4,709,581

AIR FLOW METER

Yutaka Nishimura, and Yoshishige Oyama, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 26, 1985, Ser. No. 769,309
Claims priority, application Japan, Sep. 7, 1984, 59-186370
Int. Cl.[4] G01F *1/68, 5/00*
U.S. Cl. 73—202 **7 Claims**



1. An air flow meter in an internal combustion engine, the air flow meter comprising:

a main passageway having an air inlet portion;

an air flow rate measuring tube mounted in said main passageway and extending over a predetermined axial length thereof;

a bypass passageway formed in the air flow rate measuring tube and including an air inlet portion located substantially in a central portion of a cross-sectional area of said main passageway and an outlet portion disposed downstream of the air inlet portion of said main passageway, said bypass passageway including at least one substantially straight portion having a constant cross-sectional area, and at least one further portion extending substantially at a right angle to said substantially straight portion, said bypass passageway having an axial length greater than said predetermined axial length of said air flow rate measuring tube;

a hot wire type air flow sensor mounted in the at least one substantially straight portion of the bypass passageway;

a control means including a control circuit means for controlling an operation of said hot wire type air flow sensor;

wherein said hot wire type air flow sensor and said control means are formed as an integral unit forming a sensor assembly insertable in said air flow rate measuring tube, said sensor assembly in said air flow rate measuring tube and said air flow rate measuring tube form a unit insertable in said air inlet portion, and

wherein the air flow rate measuring tube including the bypass passageway and the hot wire type air flow sensor is exposed to the main air flow so that a temperature of the air in the bypass passageway becomes substantially equal to a temperature of the air in the main passageway.

4,709,582

INSPECTION DEVICE FOR ROTOR BINDING DEFECTS IN ELECTRICAL MACHINES

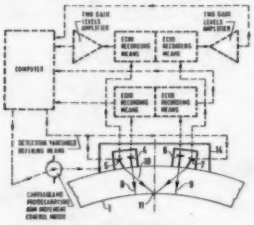
Michel Besanceney, Plancher-Bas Centre, France, assignor to Alsthom, Paris, France

Filed Mar. 6, 1986, Ser. No. 836,885
Claims priority, application France, Mar. 6, 1985, 85 03302
Int. Cl.[4] G01N *29/04*
U.S. Cl. 73—622 **7 Claims**

1. Device for inspecting electrical machine rotor bindings for defects, comprising a self-powered carriage movable about the rotor shaft and a probe-carrying arm carried by said carriage and operable to move longitudinally parallel to the axis of the rotor between the stator and the rotor binding, said arm carrying at its extremity two detector units each comprising a

right angle, longitudinal wave probe and an oblique angled, transverse wave probe, each of the latter being symmetrically inclined with respect to the radii of the rotor and acting both as transmitter and receiver, wherein are additionally provided:

means for recording the echoes from the right angle probes defining the strength of the acoustic coupling, the thickness of the binding band and the location—in or outside the binding zone—of the inspection point,



means for recording the echoes from the oblique-angled probes within a time interval centered on the travel time corresponding to the inspected zone,

and means of control defining for the oblique-angled probes, on the basis of the indications from the right angle probes, a detection threshold varying in height according to whether the inspection point is located in a bound zone or an unbound zone.

4,709,583

ELECTROMAGNETIC FLOW METER USING A PULSED MAGNETIC FIELD

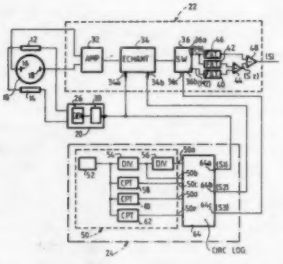
Thijlbert De Paepe, Palaiseau, and Gérard Crochet, Cernay La Ville, both of France, assignors to Sereg, Montrouge, France

Filed Oct. 28, 1986, Ser. No. 923,991

Claims priority, application France, Oct. 31, 1985, 85 16192

Int. Cl.[4] G01F *1/60*

U.S. Cl. 73—861.17 **9 Claims**



1. An electromagnetic flow meter comprising:

a measuring tube for passing the liquid whose flow rate is to be measured;

induction windings have an excitation current passing therethrough for setting up a magnetic field perpendicular to the direction of liquid flow;

diametrically-opposed electrodes for sensing the voltage signal which results from the flow of liquid through the magnetic field;

a circuit for feeding current to said induction windings and comprising means for generating a periodic excitation current of period T, each period T being the result of a combination in time of n periods of a first excitation current (I_1) of period T_1 and m period of a second excitation current (I_2) of period T_2, where $T_2 > T_1$, with the period T_2 being long enough to ensure that portion of the corresponding sensed voltage signal is free from the relaxation phenomenon; and

a processor circuit comprising means for generating a first intermediate measurement signal (M_1) of period T_1 and having a short response time, a second intermediate measurement signal (M_2) corresponding to the voltage signal of period T_2 and being free from measurement drift, and for combining and filtering said first and second intermediate measurement signals in order to generate a measurement signal S being both short in response time and free from drift.

4,709,584

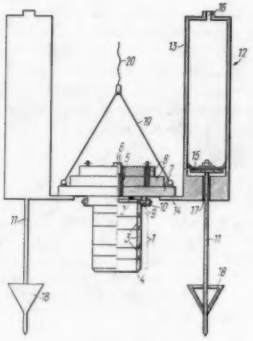
DEVICE FOR TAKING SAMPLES OF BOTTOM SEDIMENTS FROM WATER BASINS

Martin A. Voll; Robert K. Eiskop, and Kharri I. Yankovsky, all of Tallin, U.S.S.R., assignors to Institut Khimii AN, Tallin, U.S.S.R.

Filed Oct. 15, 1986, Ser. No. 918,929

Int. Cl.[4] G01N *1/04*

U.S. Cl. 73—864.44 **4 Claims**



1. A device for taking samples of bottom sediments from water basins, comprising:

a vertical coring tube;

sections of said coring tube arranged in succession one after another longitudinally of said tube;

a closed upper end of said tube;

an open lower end of said tube;

a check valve built in said upper end;

a ballast weight on said upper end;

rod-type vertical supports having upper and lower ends and a length greater than the length of said coring tube and uniformly spaced around the circumference of said coring tube;

at least three hollow cylinders with closed upper and lower ends;

a central hole in each of said upper and lower ends of each of said hollow cylinders;

a plunger in each of said hollow cylinders;

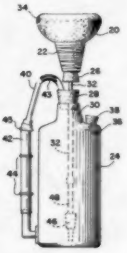
said cylinders installed around said tube, being uniformly spaced and parallel to the tube and secured by the lower ends thereof to the ballast weight, so that said lower ends of the cylinders are on a level approximately the same as that of the upper end of the tube;

each upper end of said rod-type supports passing through a hole in one of said lower ends of the cylinders and being rigidly connected to one of said plungers in one of said cylinders.

4,709,585
METHOD AND APPARATUS FOR MONITORING ENVIRONMENTAL EVAPOTRANSPIRATION

Jonathan M. Altenhofen, 4135 W. Horsetooth Rd., Ft. Collins, Colo. 80526

Filed Jun. 13, 1986, Ser. No. 874,142
Int. Cl.[4] G01N *19/10*; G01F *23/02*
U.S. Cl. 73—866.4 **19 Claims**

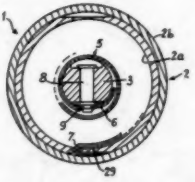


1. A method of estimating crop consumptive water use comprising the steps of:
providing a means for simulating the diffusion resistance and albedo characteristics of a crop;
providing a continuous supply of liquid to said means for simulating;
exposing said means for simulating in an outdoor environment;
measuring an amount of evaporated liquid from said means for simulating; and
determining an estimated crop evapotranspiration value by comparing said measured amount of evaporated liquid to a reference amount of evaporated liquid which is correlated with an actual crop evapotranspiration value.

4,709,586
SPRING-DRIVEN GYROSCOPE

Jacques Moutardier, Le Plessis Robinson, France, assignor to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Dec. 12, 1986, Ser. No. 941,043
Claims priority, application France, Dec. 20, 1985, 85 18958
Int. Cl.[4] G01C *19/26*; F03G *1/00*
U.S. Cl. 74—5.12 **8 Claims**

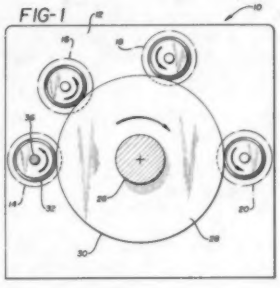


1. In a gyroscope, of the type comprising:
a hollow rotor adapted to rotate about a fixed shaft traversing it,
a leaf spring housed inside the rotor and spirally surrounding said fixed shaft,
first and second connection means for respectively joining a first end of the spring to the fixed shaft and the second end of the spring to the rotor, with the result that it is possible to store energy in the spring by tensioning it,
means for blocking the rotor with respect to the fixed shaft in a position for which the spring is tensioned,
means for controlling the blocking means in order to unblock the rotor so that it is driven in rotation by the release of the spring,
said first connection means being such that the connection that they establish is broken at the end of release of the spring,
said first connection means comprising a finger borne by a fixed shaft which is capable of being engaged in an opening in the first end of said spring; said finger being provided with a groove for fastening the front edge of the opening in the first end of the spring, the transverse and longitudinal dimensions of said opening allowing a relative movement between the finger and said opening; said spring having a tongue fixed on that part of the edge of the opening opposite that to be held in said groove, which tongue, with the spring in a tensioned position, is inclined outwardly with respect to the fixed shaft, its free end lying in contact with or in the vicinity of the end of said finger.

4,709,587
FRICTION DRIVE FOR AUTOMOTIVE AND TRUCK ACCESSORIES

Nicola Fiornascente, 165 Valley Rd., Montclair, N.J. 07042

Continuation-in-part of Ser. No. 727,766, Jun. 10, 1985, abandoned. This application Sep. 2, 1986, Ser. No. 902,950
Int. Cl.[4] F16H *37/06*; F02B *67/04*
U.S. Cl. 74—15.63 **4 Claims**



1. A friction drive arrangement for driving automotive and truck accessories, each with an input from the automotive/-truck engine thereof comprising in combination:
a drive wheel for mounting on an output shaft of said engine having an outer rim surface;
one or more driven wheels for driving said accessories having portions thereof mating frictionally with said outer rim surface, said driven wheels further comprising:
hub means for concentrically mounting the driven wheel onto the input shaft;
a cylindrical rim supported by said hub means and formed axially thereabout;
a pair of end flanges extending radially outward from the ends of the cylindrical rim;
plurality of elastic o-rings for transmitting driving forces resiliently mounted adjacently and compressively to said cylindrical rim and within said end flanges, said elastic O-rings having an inner diameter slightly less that of said cylindrical rim and being dimensioned so that each o-ring can be mounted over one of said end flanges and dimensioned to extend radially beyond said end flanges and to form axially disposed, substantially V-shaped grooves between adjacent elastic o-rings;
whereby said drive wheel transmits rotational forces to said accessories.

4,709,588

OPERATING ARM FOR AN EARTH-MOVING AND FOUNDATION MACHINE

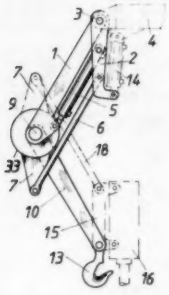
Hugo Cordes, No. 7, Rulantweg, 2000 Hamburg 50, and Hans Kröger, No. 184c, Stockfleetweg, 2000 Hamburg 62, both of Fed. Rep. of Germany

Filed Apr. 8, 1983, Ser. No. 483,320

The portion of the term of this patent subsequent to Nov. 1, 2003, has been disclaimed.

Int. Cl.[4] B25J *9/06;* **F16H** *21/04;* **G05G** *11/00*

U.S. Cl. 74—103 **10 Claims**



1. An operating arm to be adapted to an earth-moving or foundation machine for the guidance of a tool, comprising

(a) an upper arm (1) pivotally connected by a pivot pin (3) either directly to the machine or via a boom (4);

(b) a lower arm (10) pivotally connected to the upper arm and carrying the tool;

(c) a drive which moves the upper arm and the lower arm from an extended position via a folded position, in which both arms are side by side, into an oppositely extended position;

(d) a base guide (2) which is supported on the pivot pin (3) of the upper arm (1) and revolving about said pin by means of a directive cylinder (14) supported on the boom (4);

(e) an upper arm cylinder (5) driving the upper arm (1) and a connecting rod (6) being parallel to and of the same length as the upper arm, which are both pivotally connected to the base guide (2);

(f) a parallel guide (7) which is pivotally supported on the joint (9) between said upper arm and lower arm and is guided by the connecting rod (6) parallel to said base guide, and

(g) a device for equal angular movement which is connected to the parallel guide (7) and by means of which the lower arm (10) and the upper arm (1) execute equivalent but opposite angular deflections relative to the parallel guide.

4,709,589

FIXED RATIO TRACTION ROLLER TRANSMISSION

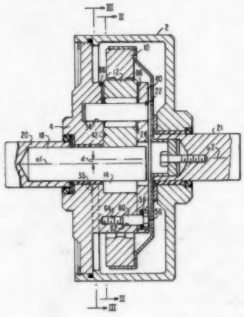
Charles E. Kraus, Austin, Tex., assignor to Excelermatic Inc., Austin, Tex.

Filed Aug. 13, 1986, Ser. No. 896,106

Int. Cl.[4] F16H *13/06, 13/02*

U.S. Cl. 74—206 **7 Claims**

1. A fixed ratio planetary type traction roller transmission having input and output shafts and comprising a mounting plate structure through which one of said shafts extends, said one shaft carrying a sun roller, a traction ring carried by the other of said shafts for rotation therewith, said sun roller being arranged within said traction ring such that an annular space is formed between said sun roller and said traction ring, a number of motion transmitting traction rollers supported in said annular space so as to be in engagement with said sun roller and said traction ring for transmitting motion therebetween, a roller alignment plate arranged opposite said mounting plate structure with said traction rollers disposed therebetween, support projections extending through said annular space between said mounting plate structure and said alignment plate in the areas between said traction rollers, said traction rollers having smooth planar side faces and said support plate structure and said alignment plate having smooth planar parallel surfaces



adjacent said traction rollers, and means associated with said support projections, said mounting plate structure and said alignment plate for resiliently urging said alignment plate and said mounting plate structure toward one another with a predetermined force thereby urging their smooth planar surfaces adjacent said traction rollers into guiding abutment with the traction rollers side faces to provide for parallel orientation of said traction rollers.

4,709,590

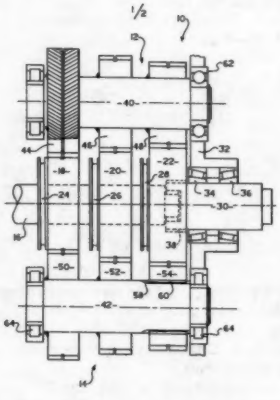
HERRINGBONE GEARED MULTIPLE LOAD SHARING COUNTERSHAFT TRANSMISSION

Elmer A. Richards, Kalamazoo, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 11, 1986, Ser. No. 872,798

Int. Cl.[4] F16H *3/08*

U.S. Cl. 74—331 **7 Claims**



1. A change speed gear transmission, comprising:

a plurality of spaced countershafts having parallel axes and means supporting said countershafts for rotation;

a plurality of sets of countershaft gears nonrotatably mounted on said countershafts, each set comprising one gear on each of the countershafts, the gears of each set being substantially identical;

driving/driven means for rotating/rotation by said counter-

shafts, said driving/driven means comprising an input-/output gear meshed with a set of countershaft gears, an input/output shaft in direct driving contact with said input/output gear and means mounting said input/output gear nonrotatably with respect to said input/output shaft;

a rotatable central shaft arranged substantially parallel with said countershafts and located therebetween such that said countershafts are substantially equally circumferentially spaced thereabout and means supporting said central shaft for rotation, said central shaft being substasntially axially aligned with said input/output shaft;

a plurality of central gears encircling said central shaft, each of said central gears constantly meshed with a set of countershaft gears;

clutch means for selectively establishing at least one dirving connection between said input/output shaft, countershafts and said central shaft through a set of countershaft gears and a selected central gear;

said transmission characterized by:

all of said gears being double-helical gears; and

all of the countershaft gears rotatably fixed to one of said countershafts also axially fixed to said one of said countershafts and, on all of the other countershafts, all but the countershaft gear meshed with the input/output gear axially fixed to the countershafts with which they are rotationally fixed, the countershaft gears rotationally fixed to said all of the other countershafts and meshed with the input/output gears being axially moveable relative to the countershaft rotating therewith.

4,709,591

RACK AND PINION STEERING APPARATUS

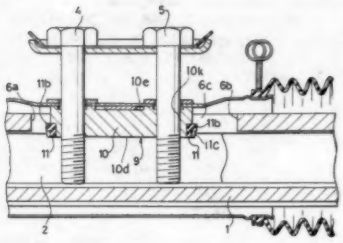
Yasuyoshi Emori, Meiwa, and Ikuo Nomura, Higashimatsuyama, both of Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 635,399, Jul. 30, 1984, abandoned. This application May 7, 1986, Ser. No. 861,743

Claims priority, application Japan, Aug. 12, 1983, 58-147388

Int. Cl.[4] F16H *19/04*; B62D *3/12*

U.S. Cl. 74—422 **5 Claims**



1. A rack-and-pinion steering apparatus, comprising:

a rack shaft received within a rack housing and axially reciprocable therein;

a pinion disposed in meshing engagement with the rack shaft and adapted to be rotated to cause axial movement of the rack shaft in response to an operation of a steering wheel;

a stop member engaged with the rack shaft and having a portion projecting outwardly through an axially elongate shaft formed in the housing and means connected to the projecting portion of the stop member for turning steerable road wheels, said stop member having a metal body disposed for end interference with opposed end faces of the elongate slot formed in the housing to limit the movement of the rack shaft in either direction as the rack shaft moves, the height of said body being measured in a direction therethrough from inside said housing outwardly of said housing, said body having opposed inboard and outboard faces respectively facing into and outwardly of said housing, said body having side faces facing sides of said slot and extending lengthwise of said slot, said body having an end in turn having a semicircular stepped cylindrical peripheral surface formed by coaxial inboard and outboard cylindrical, semicircular end faces, the inboard end face being of lesser diameter than the outboard end face and thereby forming a step having a semicircular portion facing inboard of said housing, said step lying in a plane intermediate planes defined by said inboard and outboard faces of said body, said semicircular step portion being of substantially constant radial width, said step and the inboard portion of said end defining a semicircular recess;

a resilient member which is capable of absorbing impacts produced as an inteference occurs between said end of the stop member metal body and one opposed end face of the slot, said resilient member being received in said semicircular recess in said body and having a generally L-shaped central cross-section as seen looking sideways of said body and hence widthwise of said slot and such that a central part of an outboard portion of said resilient member forms a bulge that projects endwise beyond a central part of a recessed inboard portion of said resilient member and thus defines an inboard facing step, the bulge projecting beyond said end of the stop member toward the opposed slot end face for resiliently compressing prior to allowing contact between the end of said body and the opposed end face of said slot;

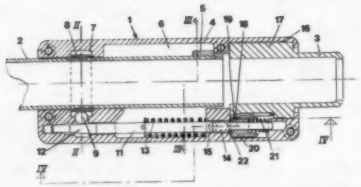
means for preventing detachment, including endwise detachment, of said resilient member from said stop member, said means comprising opposed, substantially rectilinear notches in opposite sides of said body and spaced from said end of said body, said semicircular recess defined by said semicircular step portion and semicircular inboard end face of said body extending through a half circle from one side face to the other side face of said body, said notches extending substantially diametrically into said body from the circumferential ends of said semicircular recess portion so as to undercut said semicircular inboard end face, said notches being sharply angled to the adjoining ends of said semicircular recess portion, said notches and semicircular recess portion together making said recess substantially D-shaped except that the adjacent ends of said notches are spaced apart, said notches opening sidewardly toward the opposed sides of sid housing slot, said recessed inboard portion and said bulge each being about half the height of said resilient member, said resilient member being of corresponding substantial D-shape defined by a semicircular band of substantially half-circle extent and of inside diameter corresponding to the outside diameter of said semicircular recess, said substantially D-shaped resilient member having substantially rectilinear, spaced tabs extending toward each other from the circumferential ends of said semicircular band and sharply angled with respect thereto, said tabs rising the full height of said notches from the plane of said step of said body to the plane of said inboard face of said body, said step defined by said endwise projecting bulge of said resilient member having a width diminishing circumferentially toward said tabs, such that said bulge gradually merges into coplanar relation with said inboard portion at opposide sides of said D-shaped resilient member adjacent said tabs, the engagement between the tab and the notch being effective to mount the resilient member on the body of the stop member, said notches being of depth to fully receive therein said tabs of said resilient member so the latter does not protrude beyond the body side faces, said sides of the resilient member being of substantially constant thickness throughout their height, the sides of said resilient member at said tabs being substantially flush with the side faces of said body, the sides of said housing slot lying close along the sides of said resilient member at said tabs and thereby positively blocking removal of said tabs from said notches.

4,709,592

ADJUSTABLE STEERING WHEEL SHAFT FOR VEHICLES

Olle Andersson, Dalstorp, Sweden, assignor to Verkstads AB Claes Johansson, Dalstorp, Sweden

Filed Mar. 7, 1986, Ser. No. 837,250
Claims priority, application Sweden, Mar. 7, 1985, 8501109
Int. Cl.[4] B62D *1/18*; G05G *5/16*
U.S. Cl. 74—493 10 Claims



1. An adjustable steering wheel column for vehicles provided with means for adjustment of its length and means for adjustment of its inclination relative to the vehicle body, comprising a steering wheel column housing, a first steering column tube displaceably arranged in said housing; a second steering column tube, pivotably arranged relative to said steering wheel column housing; said first and second steering column tubes being interconnected by an intermediate steering wheel column housing, said second steering column tube at its end cooperating with the steering wheel column housing being provided with a hub, which is restrictedly rotatable in a seat in the steering wheel column housing around a pivot axle extending perpendicularly to the longitudinal direction of the second steering column tube and being adapted to be locked from rotation in a number of angular positions by means of a locking mechanism, whereby a steering wheel axle and the steering wheel column housing are interconnected by an angularly adjustable coupling, and where a common control is provided for releasing or locking the length adjustment and tilting movement of the steering wheel column responsive to said common control; wherein at least one piston is axially displaceable in the housing, said piston being biased to a position in which it exerts a force locking said first steering column tube against axial displacement and further actuates a blocking means for preventing the hub from rotating around its pivot axle, whereby the piston by actuation of said control is displaceable to a first position in which it permits either axial displacement between said first steering column tube and the housing and a second position wherein it additionally permits the blocking mechanism to release the hub, thereby making possible rotation of said second steering column tube in relation to the housing or further to a second position wherein said displacement is permitted, whereby two distinct, spaced apart release positions are obtained one for each one of said motions.

4,709,593

STEERING MECHANISM FOR AUTOMOBILE

Kunio Takeuchi, Aichi, Japan, assignor to Tokai TRW & Co., Ltd., Aichi, Japan

Filed Apr. 16, 1986, Ser. No. 852,796
Claims priority, application Japan, Apr. 17, 1985, 60-81589
Int. Cl.[4] B62D *3/12*
U.S. Cl. 74—498 3 Claims

1. A rack and pinion steering mechanism for an automobile comprising:

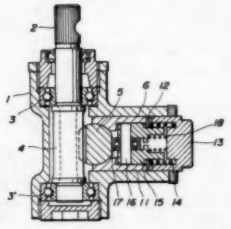
a housing;

a rack bar having rack gear teeth and being longitudinally displaceable in said housing;

a pinion rotatably mounted in said housing and having gear teeth that engage the rack gear teeth of said rack bar; and

support means located between said rack bar and said housing on the side of said rack bar remote from said pinion for supporting said rack bar to maintain engagement of the rack gear teeth with the teeth of said pinion;

said support means comprising a first yoke having surface means at one end thereof for engaging said rack bar, first spring means for biasing said first yoke into engagement with said rack bar, a ring located adjacent said other end of said first yoke, said first spring means acting on said ring which transfers the spring force to said first yoke, roller means engaging an arcuate surface defining a longitudinally extending arcuate recess on said remote side of



said rack bar, a second yoke for supporting said roller means, and second spring means acting between said second yoke and said housing for biasing said roller means into engagement with said arcuate surface;

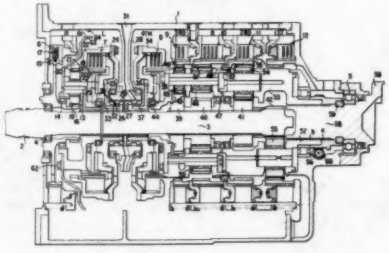
said second yoke being movable relative to said first yoke and having surface means for engaging said ring to move said ring against the bias of said first spring means and relieve the force of said first spring means from acting on said first yoke when said roller means relative to said arcuate surface upon longitudinal displacement of said rack bar.

4,709,594

PLANETARY GEAR TYPE TRANSMISSION SYSTEM

Fujio Maeda, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Jan. 2, 1986, Ser. No. 815,594
Claims priority, application Japan, Jan. 14, 1985, 60-3218
Int. Cl.[4] F16H *3/44*
U.S. Cl. 74—753 1 Claim



1. A planetary gear type transmission system comprising:

a high speed stage gear train (H) disposed on an input side of a low speed stage gear train (L),

a low speed use first rotary clutch (7) in said low speed stage gear train (L) constructed so as to directly couple a ring gear (20) in said high speed stage gear train (H) with a carrier (13) in the high speed stage gear train (H), power being input through said carrier (13) to said low speed stage gear train (L) at a 1:1 ratio when said first rotary clutch (7) is engaged and being input to said high speed gear train (H) by said carrier (13) and output therefrom by said ring gear (20) when said first rotary clutch (7) is disengaged,

a first speed stage gear train (1ST) disposed on an output side of a second speed stage gear train (2ND), a first carrier (53) in said first speed stage gear train (1ST) and a third carrier in said second speed stage gear train (2ND) being coupled to an output shaft (38), and

a fourth speed stage gear train (4TH) having the same rotation rate as said high speed stage gear train (H) and said low speed stage gear train (L), a third speed stage gear train (3RD) and a reverse stage gear train (R) being disposed between the low speed stage gear train (L) and the second speed stage gear train (2ND), said fourth speed stage gear train, said third speed stage gear train and reverse stage gear train being directly connected to each other and commonly including a second carrier (43) and a second rotary clutch (8),

said first and second rotary clutches being disposed on an intermediate shaft (3) adjacent to each other between said high speed stage gear train (H) and said fourth speed stage gear train (4TH), said intermediate shaft (3) also carrying sun gears of said first (1ST), second (2ND), third (3RD) and reverse (R) speed stage gear trains.

4,709,595

CRUISE CONTROL SYSTEM FOR VEHICLE

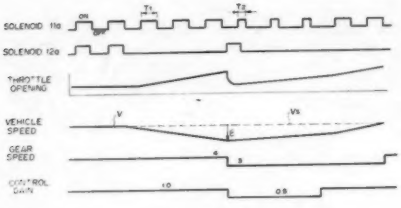
Mamoru Hayama, Hiroshima, Japan, assignor to Mazda Motor Corporation, Japan

Filed Dec. 17, 1986, Ser. No. 942,752

Claims priority, application Japan, Dec. 19, 1985, 60/286349

Int. Cl.[4] B60K *41/04*

U.S. Cl. 74—864 **10 Claims**



1. A cruise control system for a vehicle having an automatic transmission comprising a vehicle speed detecting means for detecting the actual vehicle speed, an engine output power control means, a vehicle speed control means which compares the actual vehicle speed detected by the vehicle speed detecting means with a set speed and controls the engine output power control means in accordance with the result of the comparison so that the vehicle speed is converged upon the set speed at a predetermined rate, a downshift means which causes the automatic transmission to downshift when the actual vehicle speed is lowered from the set speed by a predetermined amount while the vehicle speed control means operates to fix the vehicle speed, and a rate reducing means which, when the automatic transmission is shifted down by the downshift means, controls the vehicle speed control means to reduce said predetermined rate to a reduced rate so that the vehicle speed is converged upon the set speed at said reduced rate.

4,709,596

CONTROL OF A VEHICLE AUTOMATIC TRANSMISSION

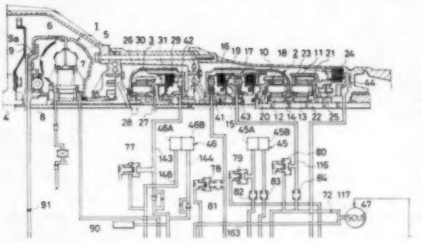
Keiji Boda, Hiroshima; Kouichirou Waki, Mihara, and Keizo Yanagisawa, Fuji, all of Japan, assignors to Mazda Motor Corporation, Hiroshima and Japan Automatic Transmission Co., Ltd., Fuji, both of, Japan

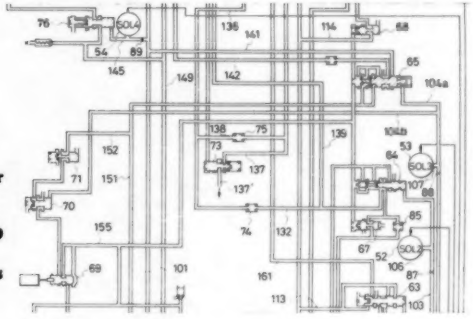
Filed Oct. 30, 1986, Ser. No. 925,244

Claims priority, application Japan, Oct. 31, 1985, 60-244840; Oct. 31, 1985, 60-244841; Oct. 31, 1985, 60-244842; Oct. 31, 1985, 60-244843; Oct. 31, 1985, 60-244844

Int. Cl.[4] B06K *41/18, 41/16*

U.S. Cl. 74—868 **17 Claims**





1. A vehicle automatic transmission including a torque converter having an engine driven input member and an output member, a multiple stage transmission gear mechanism connected with the output member of the torque converter and having a plurality of gear stages of different gear ratios, gear stage selecting means including a plurality of friction means adapted to be actuated by hydraulic actuator means and valve means for controlling supply of hydraulic pressure to said actuator means, control circuit means for operating said valve means in accordance with vehicle operating condition so that one of the gear stages is selected in accordance with a predetermined manner depending on the vehicle operating condition, said gear stages including at least a higher gear stage and a lower gear stage, said gear stage selecting means including first friction means adapted to be engaged for the higher gear stage and disengaged for the lower gear stage and second friction means adapted to be disengaged for the higher gear stage and engaged for the lower gear stage, first actuating means normally holding said first friction means in a disengaged position and operated by a hydraulic pressure to move said first friction means to an engaged position, second actuating means normally holding said second friction means in an engaged position and operated by a hydraulic pressure to move said second friction means to a disengaged position, first fluid passage means leading to said first actuator means for supplying the hydraulic pressure to the first actuator means, second fluid passage means branched from the first fluid passage means for supplying the hydraulic pressure to the second actuator means,

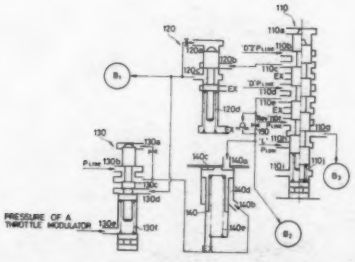
said valve means including shift valve means provided in said first fluid passage means at a point further from the first actuator means than a point where the second fluid passage means is branched from the first passage means, said shift valve means having a first position wherein the first fluid passage means is opened to a source of hydraulic pressure and a second position wherein the first fluid passage means leading to the first actuator means and the second fluid passage means is drained, timing valve means provided in said second passage means and a having a first position making it possible to supply a hydraulic pressure from said first fluid passage means through said second fluid passage means to said second actuator means and a second position for draining said second actuator means, said control circuit means including means for producing a first signal for moving the shift valve means to said second position and a second signal for moving said timing valve means to said second position after a predetermined time from the first signal.

4,709,597

HYDRAULIC CONTROL SYSTEM IN AN AUTOMATIC TRANSMISSION FOR A VEHICLE

Hideki Yasue, and Kagenori Fukumura, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 21, 1986, Ser. No. 865,372
Claims priority, application Japan, May 21, 1985, 60-108929
Int. Cl.[4] B60K *41/24*
U.S. Cl. 74—868 **3 Claims**



1. In an automatic transmission for a vehicle having a plurality of gears for providing a plurality of forward speed stages and a plurality of frictionally engaging devices for being selectively engaged and disenaged to achieve said plurality of forward speed stages, said plurality of frictionally engaging devices including a first frictionally engaging device in series with a one-way clutch and a second frictionally engaging device for a coasting mode during engine braking action, said second frictionally engaging device being disposed in parallel with said first frictionally engaging device;

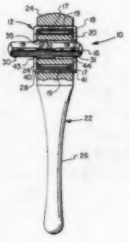
a hydraulic control system for selectively engaging and disengaging said plurality of frictionally engaging devices in a forward running range to achieve said plurality of forward speed stages, said hydraulic control system comprising means for supplying hydraulic oil pressure to said first and second frictionally engaging devices to cause both said first and second frictionally engaging devices to change from a state of disengagement to a state of engagement during an upshift from one of said speed stages to another, said hydraulic control system further comprising means for controlling the increase of hydraulic oil pressure to said first and second frictionally engaging devices during said upshift such that the pressure increase to one of said first and second frictionally engaging devices is temporarily reduced during the engagement of the other of said first and second frictionally engaging devices.

4,709,598

METHOD OF MANUFACTURING UNIDIRECTIONAL DRIVE TOOL

James Headen, Lewisville, Tex., assignor to Radian Tool Corporation, Lewisville, Tex.

Division of Ser. No. 629,083, Jul. 9, 1984, Pat. No. 4,603,606.
This application May 2, 1986, Ser. No. 858,953
Int. Cl.[4] B21K *5/16*
U.S. Cl. 76—114 **1 Claim**



1. A method of manufacturing a unidirectional drive tool comprising the steps of;

providing a housing forming at least one thin walled cup member;

providing a unidirectional clutch adapted for mounting within said housing;

providing a drive shaft adapted for mounting within said unidirectional clutch;

providing means for receiving said drive shaft within said clutch for selective longitudinal positioning therewithin and rotational engagement thereof for selective torque transmission;

securing said shaft within said receiving means of said clutch and said clutch within said cup member;

providing a torque application member having a region formed therein for receiving said housing; and

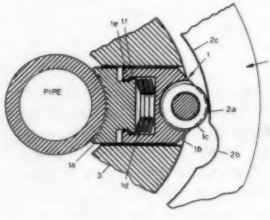
securing said housing within said region of said tool for selective unidirectional torque drive applications.

4,709,599

COMPENSATING JAW ASSEMBLY FOR POWER TONGS

David A. Buck, 118 Rue Du Pain, Broussard, La. 70518

Filed Dec. 26, 1985, Ser. No. 813,516
Int. Cl.[4] B25B *17/00*
U.S. Cl. 81—57.18 **4 Claims**



1. An improved pipe gripping assembly for use in powered pipe tongs having:

(a) pipe gripping means mounted on said power tong and arranged to move toward and away from a pipe gripping position;

(b) cam follower means mounted on the power tong and arranged to move said pipe gripping means in response to movement of actuator means of the tong for developing gripping force;

the improvement comprising:

(c) biased overtravel means situated to transmit the principle gripping forces between said pipe gripping means and said cam follower means and to permit bias resisted relative motion therebetween when gripping forces applied to the pipe exceed a preselected amount; and

(d) means mounting said pipe gripping means and said cam follower means, for said relative movement, on the pipe tong.

4,709,600

POWER SCREW DRIVER WITH A RATCHET WHEEL HAVING FINELY GRADUATED TOOTHING

Hans-Bernd Mierbach; Gustav K. Frohn, both of Königswinter, and Olaf Blockisch, Hennf, all of Fed. Rep. of Germany, assignors to Applied Power, Inc., Milwaukee, Wis.

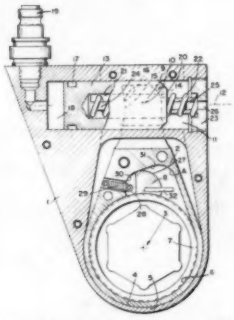
PCT No. PCT/DE85/00055, § 371 Date Oct. 25, 1985, § 102(e) Date Oct. 25, 1985, PCT Pub. No. WO85/03897, PCT Pub. Date Sep. 12, 1985

PCT Filed Feb. 25, 1985, Ser. No. 800,065

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1984, 3407126

Int. Cl.⁴ B25B *13/46*

U.S. Cl. 81—57.39 **3 Claims**



1. A wrench for rotating a work tool comprising:

a housing including a reaction arm,

a drive arm connected to said reaction arm for rotational movement relative thereto about a rotation axis extending perpendicular to said drive arm and said reaction arm;

a ratchet wheel received in said drive arm for rotational movement about said rotation axis upon operational rotation of said drive arm in a first direction of rotation;

a spring-loaded pawl housed within said drive arm for drivingly connecting said ratchet wheel to said drive arm upon rotational movement thereof in said first direction of rotation but allowing free rotational movement of said drive arm about said ratchet wheel in a second opposite direction of rotation,

a piston and cylinder assembly connected to said housing along a driving axis perpendicular to said rotation axis of said drive arm, said assembly including a cylinder and a piston within the cylinder operable to translate within the cylinder;

arcuate shaped coupling means connected between said said drive arm and said piston for converting reciprocating movement of the piston relative to the cylinder into rotational movement of said drive arm relative to said reaction arm, said coupling means including,

a recess provided in said piston, and

a head provided on said drive arm and being slidably received within said recess in said piston, said head and said recess comprising compatibly dimensional convex and concave surfaces designed for mutual engagement and said head and said recess having contact points substantially along said driving axis of said piston throughout the movement of said piston within said cylinder; and

a return spring axially extending between said cylinder and said piston and through a bore fashioned through said head of said drive arm for operably providing an elongate return stroke of said piston.

4,709,601

LONG NOSE LOCKING PLIERS

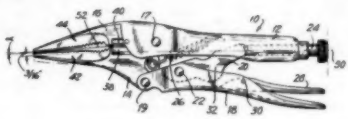
Christian Petersen, DeWitt, Nebr., assignor to Petersen Manufacturing Co., Inc., Dewitt, Neb.

Continuation of Ser. No. 353,860, Mar. 2, 1982, Pat. No. 4,546,680, which is a continuation-in-part of Ser. No. 943,180, Sep. 18, 1978, Pat. No. D. 261,096, and a continuation-in-part of Ser. No. 241,085, Mar. 6, 1981, Pat. No. 4,541,312. This application Sep. 16, 1985, Ser. No. 776,226

The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.⁴ B25B *7/12*

U.S. Cl. 81—367 **12 Claims**



1. A long nose locking hand tool having a pair of opposing jaw members, a fixed handle having an adjustment screw, and a movable handle and lever locking means therebetween for maintaining a toggle relationship between the jaw faces of said jaw members when in a closed position; wherein each of said jaw members comprising a jaw face configuration having a total jaw length to average jaw height ratio of from about 6.5 to about 11.5 with a through jaw hardness range of from about 53 to about 57 Rockwell C, with said jaw members made of an alloy spring steel, and wherein said fixed handle having a straight strike surface forming a part of said adjustment screw, and having an axis passing through said strike surface defining the direction of a line of force impartable to the hand tool; and said pair of jaws further defining a bisecting axis or line formed by the angle of said jaws when closed against a workpiece gripped therebetween; and the angle between said axes being less than about 5° when the gripping tips of said jaw members are in a generally touching or closed position.

4,709,602

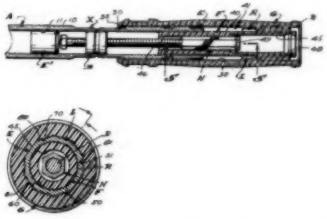
HAND GRIP DRIVE FOR TORQUE WRENCHES

Bosko Grabovac, Arcadia, and Zlatko Kurtovic, Walnut, both of Calif., assignors to Consolidated Devices, Inc., City of Industry, Calif.

Filed Jan. 16, 1987, Ser. No. 3,862

Int. Cl.⁴ B25B *23/159*

U.S. Cl. 81—483 **8 Claims**



1. In a torque wrench structure including an elongate tubular metal lever arm with front and rear ends, a handgrip at the rear end of the arm, a work-engaging head at the front end of the arm and an elongate axially-extending adjusting screw concentric within and accessible at the rear end of the arm to adjust the operating force of the torque wrech; an improved, manual-

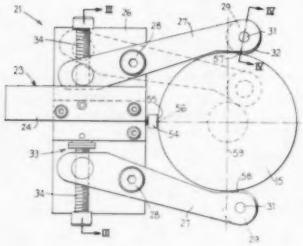
ly-operable adjusting mechanism to turn the adjusting screw, including an elongate, tubular handgrip of resilient, plastic material having front and rear ends slidably engaged about and extending longitudinally of the rear end portion of the wrench lever arm for free longitudinal and rotational movement relative thereto; an elongate core of resilient, molded plastic material having front and rear ends slidably entered in the rear end portion of the lever arm with its rear end in fixed longitudinal and rotary-driving engagement with the rear end of the grip, the grip and core are shiftable longitudinally of the arm from a normal forward position to a rear actuated position; a polygonal drive part on the adjusting screw; a longitudinally-extending opening in the rear portion of the core freely accommodating the drive part when the core is in its normal position; a longitudinally-extending polygonal opening in the core slidably receiving and establishing rotary-driving engagement with the drive part when the core is in its actuated position; and, a releaseable lock mechanism locking the grip against rotation relative to the lever arm when the grip is in its forward normal positon and releasing the grip for free rotation relative to the lever arm when the grip is in its rear, actuated position, said locking mechanism includes a plurality of circumferentially-spaced, radially outwardly disposed, inner flats on and about the exterior of the rear end portion of the lever and a plurality of circumferentially-spaced, radially inwardly disposed, outer flats about the interor of the grip and in flat opposing bearing engagement with the inner flats when the grip is in its normal, forward position and out of engagement with the inner flats when the grip is in its rear, actuated position, the adjacent, inner flats on the lever arm establish circumferentially-spaced, longitudinally-extending cam edges that move across the outer flats and yieldingly expand the portion of the grip defining the outer flats radially outward when the grip is forceably rotated about the lever arm when the grip is in its normal position.

4,709,603

ADJUSTABLE SIDEWARDLY LOCATED BAR PULLER

James R. Buck, 1207 SE. 10th St., Cape Coral, Fla. 33904

Filed Aug. 5, 1986, Ser. No. 893,413
Int. Cl.[4] B23B *13/02, 13/12*
U.S. Cl. 82—2.5 **9 Claims**



1. A bar puller for use with a machine tool for engaging and pulling on a bar for advancing the latter axially of the machine tool, said bar puller comprising:

a support body adapted for securement to the machine tool;

first and second levers pivotally supported on said body for swinging movement about subsstantally parallel axes, said levers projecting outwardly from said body substantially beyond said axes so that the levers project generally in the same direction, said levers projecting outwardly and terminating in free ends;

a roller rotatably supported on each of said levers adjacent the free ends thereof, each said roller being supported for rotation about an axis which is substantially parallel to the pivot axis;

stop means mounted on said body for cooperating with said first and second levers for limiting the inward swinging of the levers and the rollers thereon toward one another for defining a minimal spacing between said rollers which is less than the diameter of said bar;

manually actuable adjusting means for adjusting the position of said stoop means relative to said body to selectively adjust the magnitude of said minimal spacing between said rollers;

said stop means incuding a pair of stop members movably supported on said body, spring means coacting between said stop members and normalaly urging them outwardly in opposite direction, and a pair of stops fixed to said body, said spring means normally maintaining said stop members in engagement with said stops; and

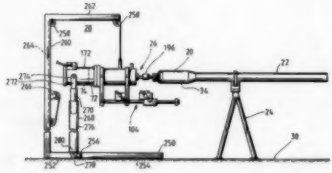
said adjusting means including threaded adjusting members coacting with said stop members and being threadably engaged with said levers so that rotation of said threaded adjusting members causes the position of said stop members to be adjusted relatve to said levers so as to vary said minimal spacing between said rollers.

4,709,604

APPARATUS FOR MILLING EXTERIOR SURFACES AND REFACING BOTH SHOULDERS OF A TWO-SHOULDER TOOL JOINT

John M. Rogers, P.O. Box 777, Luling, Tex. 78648

Filed Jul. 10, 1986, Ser. No. 883,987
Int. Cl.[4] B23B *5/16*
U.S. Cl. 82—4 C **4 Claims**



1. A portable multipurpose device for refacing a make-up shoulder and a secondary shoulder of a two-shoulder tool joint having a screw thread for engagement with another tool joint, the device comprising: a support means; a rotary drive source supported by said support means; a carriage means supported by said support means for movement parallel and transverse to a rotational axis of said rotary drive source; lathe tool means on said carriage; a first adapter having means to engage said screw thread of said tool joint and means for engagement with said rotary drive source to provide for rotary drive of said tool joint; said first adapter having a first gage means for measuring said make-up shoulder of said tool joint, whereby said make-up shoulder can be precisely refaced by said lathe tool means; a second adapter adapted to be substituted for said first adapter; said second adapter having rotary tool means and means to connect said rotary tool means with said source of rotary drive; said second adapter having means for engagement with said screw thread of said tool joint and having a second gage means calibrated corresponding to said first gage means for measuring said secondary shoulder, whereby said secondary shoulder can be precisely refaced by said rotary tool means in accordance with the amount of material removed from said make-up shoulder.

4,709,605

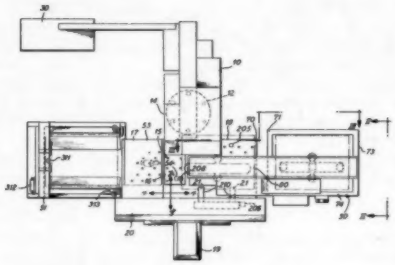
METHOD OF WORKING SHEET MATERIAL WORKPIECES BY A SHEET MATERIAL WORKING MACHINE TOOL

Stephen C. Clark, Williamsville, N.Y., assignor to Strippit/Di-Acro-Houdaille, Inc., Akron, N.Y.

Division of Ser. No. 52,241, Jun. 26, 1979, which is a continuation of Ser. No. 815,821, Jul. 15, 1977, abandoned. This application Apr. 8, 1985, Ser. No. 720,725

Int. Cl.[4] B23Q *7/04;* B21D *43/11, 43/22, 43/24*

U.S. Cl. 83—23 26 Claims



1. The method of automatically running a machine tool assembly which includes a machine tool and an associated worktable provided with workpiece gripping members movable in at least X and Y axes directions with respect to a work station of the machine tool, the machine tool and gripping members controlled from an automatic control which comprises the steps of: providing a loading device adjacent the worktable, controlling the loading device from the control to cause the loading device to:

(a) segregate a workpiece from a stack of workpieces,

(b) move the workpiece to a generally defined loading area of the worktable and,

(c) deposit the workpiece on the loading area of the worktable,

thereafter gauging the workpiece in X and Y axes directions by movement of the workpiece on the worktable under control of the control and sensing the positioning of the workpiece on the worktable as a result of said movement by sensing contact between edges of the workpiece with machine tool assembly associated devices having predetermined positions at the time of sensing providing signals to said control as a result of said sensing indicating proper gauging of the workpiece in X and Y axes directions, controlling further movement of the gripper members by the control utilizing said gauging as a reference for said further movement, production running said workpiece through said machine tool, terminating said production run, moving said workpiece by said gripping members under control of said control to an unload area of the worktable, withdrawing said gripping members from contact with said workpiece, activating an unload device by said control to unload the workpiece from the unload area of the worktable, and repeating the steps of loading, gauging, production running and unloading.

4,709,606

PLANT FOR PRODUCING STACKS OF INTERMESHED BLANKS OF PAPER, CELLULOSE OR THE LIKE, FOLDED IN A ZIG-ZAG MANNER

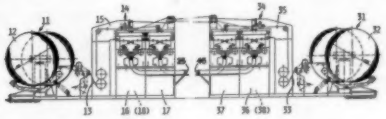
Kurt Stemmler, Neuwied, Fed. Rep. of Germany, assignor to Winkler & Dünnebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG, Neuwied, Fed. Rep. of Germany

Filed Dec. 10, 1985, Ser. No. 807,318

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447404

Int. Cl.[4] B26D *7/06*

U.S. Cl. 83—94 5 Claims



1. A plant for the production of stacks of intermeshed blanks of paper material made from cellulose or the like, folded together in a zig-zag fashion, consisting of more than one stack producing unit, comprising: two material web unrolling stations, each with a supply roll (12,32) of paper material webs, associated with and at opposite ends of the plant, each of the material webs (13,33) correspond in width to an even-numbered multiple of the width of the individual blanks of the stacks (25,45); and means are provided for feeding said material webs toward and aligned with each other; longitudinal cutting stations (14,34) for dividing each of said material webs (13,33) into an identical even numbered plurality of partial webs (19 to 24; 39 to 44) are provided and connected at the output side of said two material web unrolling stations (11,31); the resultant partial webs (19,39; 20,40; 21,41; 22,42; 23,43; 24,44) of each material web opposing each other and feeding toward each other in the longitudinal direction of the webs constitute pairs of partial webs; and means are provided for feeding each partial web, of each pair of partial webs, to an associated one of said stack producing units (16, 17, 18, 36, 37, 38) from two opposing sides of the associated stack producing units; and each of the stack producing units (16,36; 17,37; 18,38) for laterally adjacent pairs of partial webs (19,39; 20,40; 21,41; 22,42; 23,43; 24,44) are arranged in displaced relation to each other in the direction of the path between the two supply rolls permitting the adjacent partial webs to be juxtaposed in the lateral direction.

4,709,607

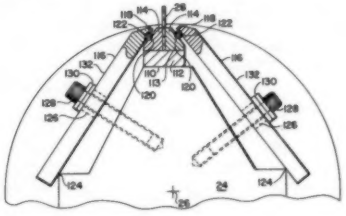
ROTARY CUTTER BLADE CLAMP

Eric S. Buhayar, P.O. Box 309, Swarthmore, Pa. 19081

Filed Apr. 15, 1983, Ser. No. 485,566

Int. Cl.[4] B26B *1/40*

U.S. Cl. 83—342 2 Claims



1. In a rotary cutter for cutting thin flexible web materials, the rotary cutter comprising a first blade, mounted in a roll rotating about a first axis, the first blade cooperating with a second blade, mounted for rotation about a second axis, an

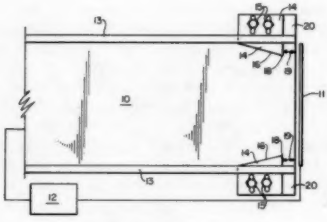
improved apparatus for clamping the first blade in the roll comprising plural pairs of clamp members for positioning individual segments of the blade along the length of the roll, each pair of clamp members having opposed planar surfaces for contacting a segment of the blade and each clamp member being (i) adjustable to position its planar surface in a direction generally perpendicular to the plan of the blade, and (ii) able to adjust the direction of its planar surface with respect to the axis of the roll; and when clamped, said opposed planar surfaces and the blade segment there between all have the same planar angle, one clamp member of each pair having at one end the blade contacting planar surface, the other end being connected to the roll by means of a ball joint, said one clamp member having a bearing surface and bolt means extending therethrough into the roll which when tightened exerts a clamping force on said bearing surface and on the blade surface.

4,709,608

APPARATUS FOR SECURELY HOLDING A LOAF FOOD PRODUCT DURING SLICING

Charles J. Vietrogoski; Richard Obarowski, and Paul J. McDonough, all of Dover, Del., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 13, 1986, Ser. No. 862,883
Int. Cl.[4] B26D *7/01*
U.S. Cl. 83—355 **14 Claims**



1. In apparatus for automatically slicing a loaf food product, said apparatus comprising:

slicing means comprising a slicing blade for slicing a loaf food product;

conveyor means for conveying a loaf food product along a path to said slicing means for slicing a loaf food product;

means for automatically actuating said slicing means and said conveyor means for producing slices of the loaf food product having a desired slice thickness; and

a pair of guide members located on opposite sides of said path for guiding a loaf food product along said path and for preventing lateral displacement of a loaf food product from said path;

the improvement which comprises:

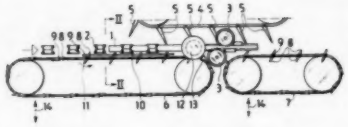
a pair of loaf-engaging members, each of said loaf-engaging members extending longitudinally along one of said guide members and having an inner edge tapering generaly inwardly into said path and away from said guide members in a direction towards said slicing, each of said loaf-engaging members being positioned upstream of said slicing means and having a loaf-engaging area, said loaf-engaging area being spaced upstream of said slicing means a distance not greater than said slice thickness.

4,709,609

SAW MACHINE

Kauko Rautio, Kolmihaarantie, 52700 Mäntyharju, Finland

Continuation of Ser. No. 783,321, Oct. 2, 1985, abandoned, which is a continuation of Ser. No. 566,683, Dec. 29, 1983, abandoned. This application Dec. 9, 1986, Ser. No. 940,183
Claims priority, application Finland, Dec. 30, 1982, 824522
Int. Cl.[4] B26D *7/06*; B27B *13/00*
U.S. Cl. 83—435.2 **7 Claims**



1. A sawing machine for logs, comprising:

multiple spaced rollers which guide a log laterally to center it and feed it forward to at least one sawblade of the sawing machine;

a transporting chain assembly located between and under the multiple rollers for feeding the log to the sawblade, said transporting chain assembly extending both before and after the sawblade; and

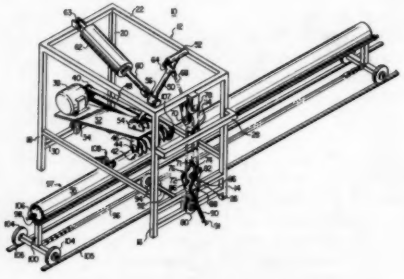
a staying chain provided above the log for staying the log by means of staying spikes turnably attached to the staying chain and acting on the log surface, said staying chain being located before and after said sawblade, wherein the transporting chain assembly below the log carries multiple turnable supporting members which adapt their position to the shape of the log's surface, and which supporting members support the log at a plurality of points and clamp the log between the transporting chain and the staying chain so as to maintain its unchanged horizontal and vertical position relative sawblade during its forward motion through the sawing machine.

4,709,610

CUTTING APPARATUS WITH AUTOMATIC FEED

James R. Pool, 402 Colorado St., Athens, Tex. 75751

Filed Jun. 30, 1986, Ser. No. 879,992
Int. Cl.[4] B26D *3/16, 5/22*
U.S. Cl. 83—876 **25 Claims**



1. An apparatus for operating on a workpiece, comprising:

moveable carriage means for holding the workpiece in a horizontal position, said carriage means operable to move the workpiece back and forth along a set direction;

working means for contacting the surface of the workpiece and operating on the workpiece in a predetermined manner;

platform means attached to said working means, said platform means operable to move said working means towards and away from the workpiece disposed on said carriage means;

incrementing means for interacting with said carriage means to move the workpiece a predetermined interval along its travel path in response to said platform means moving said working means away from the workpiece, said incrementing means having:

a chain; and

ratchet means operable between first and second points, said ratchet means engageable with said chain when moving from said first point to said second point, and said ratchet means retractable from said chain when moving from said second point to said first point; and

said incrementing means activated when said platform means moves said working means away from the workpiece by a predetermined distance such that the workpiece can move along its travel path without making contact with said working means.

4,709,611

ELECTRONIC MUSICAL INSTRUMENT FOR GENERATING A NATURAL MUSICAL TONE

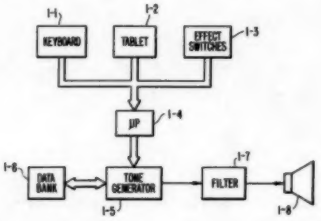
Yoshiyuki Takagi, Osaka, and Tetsuhiko Kaneaki, Ashiya, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Mar. 18, 1986, Ser. No. 841,110

Claims priority, application Japan, Mar. 19, 1985, 60-53249; Apr. 20, 1985, 60-83621; Apr. 27, 1985, 60-89919

Int. Cl.[4] G10H *1/057, 1/08, 7/00*

U.S. Cl. 84—1.22 **5 Claims**



1. An electronic musical instrument comprising:

a data bank for storing a first waveform data corresponding to an attack portion and one cycle waveform of a cyclic portion following the attack portion of a first musical tone, a second waveform data corresponding to one cycle waveform of a cyclic portion of a second musical tone, a first parameter data representing a first envelope data corresponding to a sound level variation of the first musical tone, and a second parameter data representing a second envelope data corresponding to a sound level variation of the second musical tone;

envelope forming means which reads out the first and second parameter data from the data bank and forms the first and second envelope data;

first musical tone data producing means which reads out the first waveform data from the data bank, the data corresponding to the one cycle waveform of the first waveform data being read out repeatedly, thereby producing a first continuous waveform data including at the beginning thereof the data corresponding to the attack portion, and multiplies the first continuous waveform data by the first envelope data to produce a first musical tone data including at the beginning thereof the data corresponding to the attack portion;

second musical tone data producing means which reads out the second waveform data repeatedly from the data bank thereby producing a second continuous waveform data, and multiplies the second continuous waveform data by the second envelope data to produce a second musical tone data;

musical tone data producing means which adds the first and second musical tone data to produce a synthesized musical tone data including at the beginning thereof the data corresponding to the attack portion; and

means generating a musical tone including an attack portion according to the synthesized musical tone data.

4,709,612

NUT FOR STRINGED INSTRUMENTS

Trevor A. Wilkinson, 1075 State St., #201, Redlands, Calif. 92373

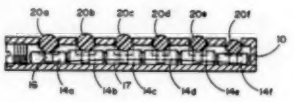
PCT No. PCT/US85/01428, § 371 Date Mar. 27, 1986, § 102(e) Date Mar. 27, 1986, PCT Pub. No. WO86/01024, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 25, 1985, Ser. No. 847,652

Claims priority, application Australia, Feb. 27, 1984, PG6259

Int. Cl.[4] G10D *3/04*

U.S. Cl. 84—314 N **4 Claims**



1. A nut for stringed instruments, comprising:

(a) an elongated body having transversely extending grooves formed in the top surface thereof to receive therein the strings of said instrument and a bore axially formed in said body; and

(b) at least one roller so disposed axially therein that it can freely individually roll on the bottom surface of said bore;

(c) the depth of said grooves being such that a portion of the surface of said roller protrudes into said grooves, said strings being supported by said roller surface in said grooves; and

(d) each of said grooves having a width slightly larger than the diameter of the string associated with said groove rearwardly of said roller, and flaring outwardly in front of said roller;

(e) whereby said strings are laterally constrained by said groove rearwardly of said roller, and are free to move in any direction forwardly of said roller, and can freely move through said grooves transversely to said nut.

4,709,613

VARIABLE TENSIONING MECHANISM FOR DRUM HEAD

Steven Powers, 205 E. 67th St., New York, N.Y. 10023, and Morton Breier, Memory La., Greenwich, Conn. 06831

Filed Aug. 18, 1986, Ser. No. 897,668

Int. Cl.[4] G10D *13/02*

U.S. Cl. 84—413 **24 Claims**

1. A variable head tensioning mechanism adapted for retrofitting on a drum of the type comprising a drum body, a drum head overlying one end of the drum body, and a hoop disposed about the drum body near said one end and secured to the periphery of the drum head, said head tensioning mechanism comprising:

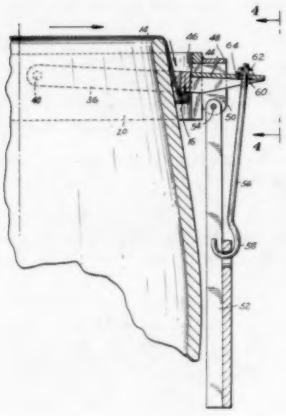
an outer ring having an internal diameter greater than the outer diameter of said hoop and securable about said drum body near said one end;

an inner ring seated on said hoop and disposed about said drum body inside said outer ring;

means for securing said inner ring to said outer ring for movement relative thereto;

stop means defining a limit on movement of said inner ring towards said one end of said drum body; and

means for moving said inner ring relative to said outer ring towards the other end of said drum body for moving said



hoop towards said other end for varying the tension on said drum head.

4,709,614

THROWING DEVICE FOR FIRING INCANDESCENT BODIES

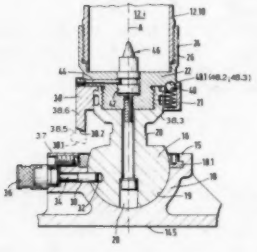
Walter Klümpp, Duisburg, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 19, 1986, Ser. No. 910,112

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1985, 3533417

Int. Cl.[4] F41F *1/06*

U.S. Cl. 89—1.35 **3 Claims**



1. A throwing device preferably for firing incandescent bodies which, together with a predetermined number of incandescent bodies, can be transported, assembled, operated, and disassembled, by only one person, comprising,

a tube with a bore axis therethrough, having a muzzle on one end; and

a base plate;

said tube is operatively mounted on the base plate by a tube plate which is opposite the muzzle end of the tube; said tube is provided with

a firing pin and

a spherical part of a universal joint, having a bore on one side, and arranged near the firing pin at the tube end; said base plate having

a base plate socket which is operatively connected to the spherical part of the tube;

a selector dial for predialing a predetermined tube angle and throw distance, said dial is rotatably arranged on the tube near the spherical part; the tube is separable into

partial tube sections; and

an operable holding device is placed at the muzzle end of the firing tube,.

4,709,615

ELECTRICAL FIRING SYSTEMS

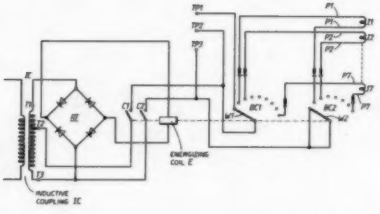
John R. Field, Fareham, England, assignor to Plessey Overseas Limited, Ilford, England

Filed May 8, 1985, Ser. No. 731,899

Claims priority, application United Kingdom, May 10, 1984, 8411977

Int. Cl.[4] F23Q *5/00*; H01H *47/00*

U.S. Cl. 89—1.56 **3 Claims**



1. An electrical firing arrangement for firing in sequence a plurality of mortars stacked in end-to-end relationship within the barrel of a mortar launching means comprising:

an electromagnetic stepping switch including an operating coil, a normally-open make and break switch contact means, and a wiper switch contact means having movable wipers and a plurality of associated fixed contacts;

means for applying energising pulses to the electromagnetic stepping switch to produce a stepping operation of the electromagnetic stepping switch in response to successive energisations of the operating coil;

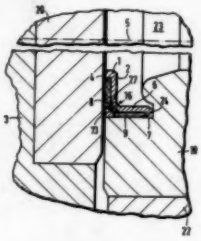
means for applying, simultaneously with said energising pulses, mortar firing pulses in sequence to igniters of the respective mortars through said normally-open make and break switch contact means when said normally-open switch make and break contact means are in the closed condition and through a respective conductor means as the electromagnetic switch and movable wipers are stepped from one position thereof to the next; and

said energising pulses and said mortar firing pulses being derived from said means for applying energising pulses and closure of said normally-open make and break switch contact means responsive to the energisation of the operating coil by each of said energising pulses being delayed until after movement of said moveable wipers of the wiper switch contact means out of engagement with one pair of associated fixed contacts and towards the next pair of contacts to prevent a short-circuit condition which may exist across any pair of associated fixed contacts of the wiper switch contact means due to short-circuiting of the respective conductor means from depriving the opreating coil of an energising pulse whereby the electromagnetic stepping switch would fail to step to its next position.

4,709,616
OBTURATOR RING FOR A CANNON

Rolf Bartolles, Korschenbroich, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 30, 1985, Ser. No. 696,415
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1984, 3404676
Int. Cl.⁴ F41F *11/02*
U.S. Cl. 89—26 **4 Claims**

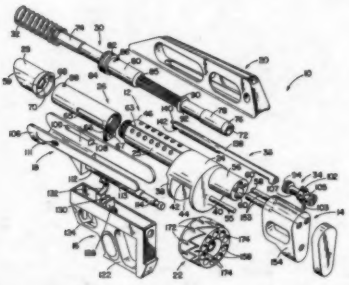


1. A ring breech obturator system for a cannon, comprising an obturator ring having an angular cross section, which is positioned in use between the base ring of the barrel of the cannon and a wedge insert of a wedge-type breech block of the cannon, wherein a radial flank of the obturator ring, having internal and external sides, has positioned, on its external side adjacent the wedge insert of the breech block, a disc-shaped lining, and wherein a flank parallel to the axis of the barrel, having internal and external sides, has positioned, on its external side, a cylindrical-shaped lining, the two linings being deformable under gas pressure against the base ring and the wedge insert, respectively; the flanks of the obturator ring each has a trapezoid cross sectional recess to accommodate the respective linings, the cross section of each recess decreasing in width linearly towards the outer surface; said disc-shaped lining and said cylindrical-shaped lining, are each composed of an elastomer.

4,709,617
FIREARM

John A. Anderson, P.O. Box 5620, Hamden, Conn. 06518

Filed Jun. 21, 1984, Ser. No. 622,793
Int. Cl.⁴ F41D *7/04*
U.S. Cl. 89—157 **24 Claims**

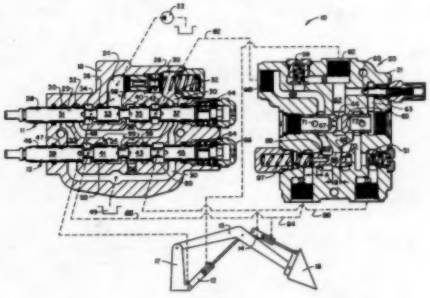


2. A firearm comprising barrel having a bore extending axially therethrough, means supporting said barrel for axial reciprocal forward and rearward movement, a generally cylindrical rotary magazine drum having front and rear walls and defining a circumaxial series of firing chambers and a circumaxial series of sets of cam recesses equal in number to said firing chambers each of said cam recesses opening outwardly through the peripheral surface of said drum and having generally angularly opposed wall surfaces defining a cam track, each of said sets of cam recesses including a front cam recess opening outwardly through said front wall and a rear cam surface independent of said front cam recess and opening outwardly through said rear wall, means supporting said magazine drum rearward of said barrel for indexible rotation about its axis, and means for indexing said magazine drum about its axis to sequentially position each one of said firing chambers in a firing position wherein it is coaxially aligned with and defines a rearward extension of said bore and including a front indexing cam for engaging the cam track of an associated front cam recess during rearward movement of said barrel and a rear indexing cam for engaging the cam track of an associated rear cam recess during forward movement of said barrel, and means for moving said indexing cams in unison in response to said movement of said barrel.

4,709,618
SERIES SELF-LEVELING VALVE WITH SINGLE SPOOL FOR UNLOADING AND RELIEF

Dwight E. Zongker, Plevna, Kans., assignor to The Cessna Aircraft Company, Wichita, Kans.

Filed Oct. 2, 1985, Ser. No. 783,119
Int. Cl.⁴ F15B *11/22, 13/07*; B66F *3/46*
U.S. Cl. 91—31 **1 Claim**



1. A self-leveling hydraulic system controlling two or more functions including a boom and bucket; double-acting cylinders controlled by separate boom and bucket directional control valves and an open-center series circuit with the boom control valve located upstream of the bucket control valve with a pressure source supplying the valves in a series path across open-center positions of each valve to reservoir;

a self-leveling valve including a flow-dividing valve means connected to the rod end of the boom cylinder which splits the flow from the boom cylinder into two flow paths;

a first passage means connecting the first of said two flow paths with an end of the bucket cylinder supplying a sufficient flow to maintain the bucket at a level position as the boom raises;

a second passage means connecting the second of said two flow paths with an open-center path downstream of the boom valve and upstream of the bucket valve whereby the bucket valve can be separately actuated concurrent with the boom valve and supplied with oil so as to override the boom cylinder if desired;

a third passage means connecting the opposite end of the bucket cylinder with the second passage means whereby the bucket cylinder discharge is returned to the circuit upstream of the bucket control valve, and the improvement comprising:

a servo-operated spool type valve means with dual functions as an unloading valve and a relief valve positioned in said third passage means normally spring-biased closed in a

first position blocking flow in the third passage means and a servo means acting on the valve against said biasing means sensing pressure in the first passage means which in a second spool position opens flow in the third passage means when a minimum pressure level is reached in the first passage means and a third spool position when maximum pressure is reached in the first passage means which opens the first passage means to relief into the second passage means.

4,709,619

PROPORTIONAL MAGNET

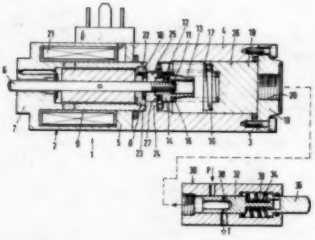
Reiner Bartholomäus, Neuendorf, and Karlheinz Widmann, Lohr, both of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Continuation of Ser. No. 631,129, Jul. 16, 1984, abandoned. This application Nov. 18, 1986, Ser. No. 931,884

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1983, 3329734

Int. Cl.⁴ F01B *31/00*

U.S. Cl. 92—130 D **17 Claims**



1. In proportional magnet apparatus having a magnet unit with a housing in which an armature bar is mounted which is movable from a rest position under the influence of a magnetic field from an armature winding arranged in the housing and having means for providing a force biasing said armature bar to said rest position, the improvement comprising a hydraulic actuator unit with a housing having a control piston therein, means coupling the armature bar to said piston for moving said armature bar when said hydraulic unit is actuated in a manner equivalent to that of said magnetic field, and means for manually controlling the application of hydraulic pressure to said hydraulic unit for actuating said piston, wherein said coupling means contains a spring arrangement, said control piston is mechanically connected via said spring arrangement to said bar, said spring arrangement providing means for translating the hydraulically produced forces on said piston into forces which are the same as applied to said armature bar by said proportional magnet armature winding, and wherein said coupling means spring arrangement comprises a return spring bearing on said control piston and a control spring opposing the force of said biasing means by way of means enabling said control spring to bear on said armature bar, said control spring being preloaded said preload being less than a preload of said biasing means so that said control spring does not move said armature bar in said rest position, said return spring and said control spring bear on the side of said control piston which faces towards the interior of said hydraulic unit, and said return spring bears on said hydraulic housing.

4,709,620

PISTON AND CONNECTING ROD ASSEMBLY

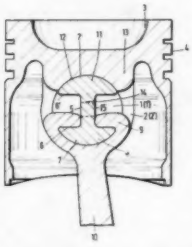
Siegfried Mielke, Neckarsulm, Fed. Rep. of Germany, assignor to Kolbenschmidt AG, Neckarsulm, Fed. Rep. of Germany

Continuation of Ser. No. 641,531, Aug. 16, 1984, abandoned. This application Apr. 14, 1987, Ser. No. 39,813

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1983, 3331300

Int. Cl.⁴ F16J *1/16*

U.S. Cl. 92—187 **6 Claims**



1. In a piston and connecting rod assembly for a reciprocating piston machine having a piston, a piston pin in the piston and a connecting rod connected to the piston pin, the improvement wherein the piston pin has a cross-section with the wide upper and lower flanges connected by a narrow web with parallel sides, said piston pin having an I-shaped cross-section, wherein the flanges comprise circular segments with outside surfaces along an arc of a circle and inside surfaces on both sides of the parallel sides of the narrow web, wherein the connecting rod has means clamping the piston pin in a fixed position in the connecting rod, said clamping means comprising a forked small end portion on the connecting rod which embraces the inside and outside surfaces of the lower flange of the piston pin.

4,709,621

INTERNAL COMBUSTION ENGINE PISTON AND A METHOD OF PRODUCING THE SAME

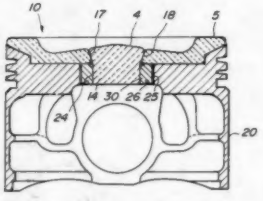
Minoru Matsui, Nagoya, and Nobuo Tsuno, Kasugai, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Mar. 5, 1985, Ser. No. 708,404

Claims priority, application Japan, Mar. 13, 1984, 59-46411

Int. Cl.⁴ F02F *3/12*

U.S. Cl. 92—212 **3 Claims**



1. An internal combustion engine piston comprising a metal piston body having a top portion and a piston cap which includes a plurality of ceramic pieces, said piston cap being fixed to the top portion of the metal piston body, wherein the piston cap comprises at least one ceramic material, at least one of the ceramic pieces is provided with a cylindrical projection which is fixed to the metal piston body indirectly by engagement of the cylindrical projection with a metallic member, said metallic member being secured to the metal piston body by being screwed thereto, and any of said plurality of ceramic pieces not

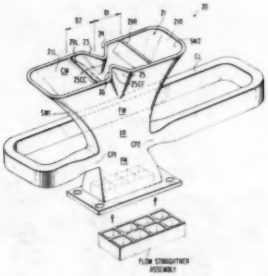
having said cylindrical projection are fixed to the metal piston body by said at least one ceramic piece having a cylindrical projection.

4,709,622

FLUIDIC OSCILLATOR

Ronald D. Stouffer, and Patrick T. Sharkitt, both of Silver Spring, Md., assignors to Bowles Fluidics Corporation, Columbia, Md.

Filed Apr. 7, 1986, Ser. No. 848,440
Int. Cl.[4] B60H *1/34*
U.S. Cl. 98—2 **9 Claims**



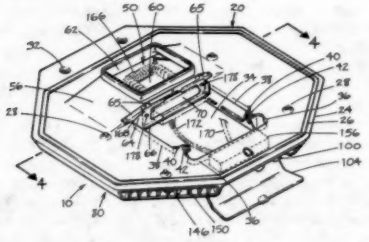
9. In a motor vehicle windshield defrost/defog system having a source of defrost/defog air and a centrally located nozzle for issuing defrost/defog air upon the driver and passenger sides, respectively, of a windshield surface to be cleared, the improvement comprising means for causing said defrost/defog air to issue in two alternating slug flows of substantially the full intensity of said source, first one of said two slug flows upon the driver side for a predetermined period of time and then the other of said two slug flows upon the passenger side for essentially the same predetermined period of time.

4,709,623

CEILING DISTRIBUTOR DUCT ASSEMBLY FOR ROOFTOP AIR CONDITIONERS

James E. Roth, DeSoto, and David W. Bales, Manchester, both of Mo., assignors to Nordyne, Inc., St. Louis, Mo.

Filed Aug. 22, 1986, Ser. No. 899,249
Int. Cl.[4] F24F *13/06*
U.S. Cl. 98—40.05 **13 Claims**



1. For use with an air conditioner to be installed on the roof spaced above a ceiling over room space, a ceiling distributor duct assembly comprising

A. a substantially planar ceiling plate, having there-through, at the plane of said plate,

a return air opening and a conditioned air discharge opening, both located adjacent to each other in fore-and-aft relationship substantially along a centerline of said plate,

said conditioned air discharge opening being part of an upper plenum portion including a plenum inlet having duct connector means above the plane of said ceiling plate, forward-and-aft walls transverse to such centerline and reaching down at least to said plane, and plenum sides diverging outwardly and downwardly to the plane of said plate,

in combination with

B. a molded plastic air distributor box having a bottom wall terminating in an outer margin presented sealedly against the ceiling plate,

said air distributor box bottom wall having a return air opening adapted to communicate with the said return air opening of said ceiling plate, and having a bottom plenum wall portion at a depth beneath said ceiling plate sufficient to afford air flow sidewardly outward from said plenum inlet,

there being provided, as between said ceiling plate and said air distributor box bottom wall, vertical walls along the forward-and-aft sides of said bottom plenum wall portion, and a pair of vertical walls bounding those sides of said distributor box return air opening which continue forwardly from that wall at the forward side of said plenum and extend to said outer margin,

whereby those bottom wall portions sideward of the said bounding vertical walls comprise, with the, duct boundaries extending sidewardly outward from said plenum inlet and forward along the sides of said return air opening to adjacent outer margin portions of the bottom wall,

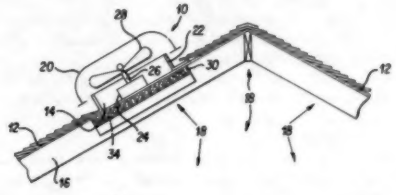
there being outlet grilles along said outer margin at the forward ends of said boundaries.

4,709,624

APERTURE SEAL FOR A ROOF MOUNTED VENTILATOR AND METHOD FOR MAKING SAME

John E. Croft, 4695 Littlefield, Beaumont, Tex. 77706

Filed Sep. 16, 1985, Ser. No. 776,366
Int. Cl.[4] F24F *7/00*
U.S. Cl. 98—119 **14 Claims**



1. An aperture seal for closing and scaling a ventilator aperture in a roof including:

a base member;

an insulating member aligned with and coupled to the base member;

a first cover means aligned with the coupled to the insulating member on the side thereof opposite the base member for enhancing heat retention and for protecting the insulating member;

means coupled to the first cover means for adhesively engaging the roof;

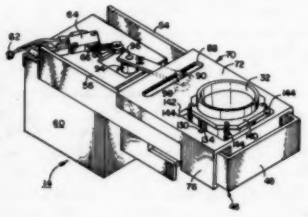
a second cover means for holding and protecting the adhesively engaging means on the first cover means and for allowing exposure of the adhesively engaging means so that the adhesively engaging means can secure the aperture seal to the roof and close the ventilator aperture.

4,709,625

DISPENSING MACHINE FOR TEA

John Layre, Warminster; Yong S. Park, Lansdale, and George K. Schollhamer, Furlong, all of Pa., assignors to Gross-Given Manufacturing Co., St. Paul, Minn.

Filed Oct. 22, 1986, Ser. No. 921,975
Int. Cl.[4] A47J *31/00*
U.S. Cl. 99—289 R **18 Claims**



1. Apparatus for nonpressurized infusion brewing of a beverage including a brew assembly, the brew assembly comprising

a frame;

a carriage reciprocable along the frame in a first direction between a brew position and a discharge position, the carriage including a slot formed therein generally transverse to the first direction;

a motor driving a rotating shaft;

a crank arm having two ends and being attached to the shaft proximate one end;

a crank pin attached to the crank arm proximate the other end of the crank arm and extending into the slot in the carriage;

the motor being actuatable to cause the carriage to reciprocate between the brew and discharge positions by rotating the shaft whereby the crank pin reciprocates within the slot;

a brew cavity mounted to the carriage and having side walls and an open top and bottom, the brew cavity having at least one guide pin mounted on a side wall;

a filter assembly mounted on the frame and aligned with the brew cavity at the brew position and including a filter for supporting solid infusible material;

brew cavity mounting means for mounting the brew cavity to the carriage such that the brew cavity is moveable vertically with respect to the carriage between upper and lower positions;

biasing means extending between the brew cavity and the carriage normally exerting a biasing force to bias the brew cavity toward the lower position to such an extent that when the brew cavity is in the brew position, the bottom of the brew cavity is held in sealing engagement with the filter assembly surrounding the filter;

cam means having a camming surface mounted on the frame between the brew and discharge positions for engagement with the brew cavity guide pin to overcome the biasing force and for raising the brew cavity from the lower position toward the upper position as the guide pin travels along the camming surface from the brew position toward the discharge position; and

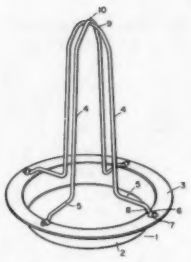
stop means associated with the brew cavity to prevent the brew cavity from extending below the lower position after the brew cavity guide pin travels past the cam means to the discharge position at which the brew cavity is abruptly biased to the lower position, whereby the infusible material from which the beverage has been brewed is dishcarged from the brew cavity.

4,709,626

FOLDABLE CHICKEN HOLDER

George J. Hamlyn, West Beach, Australia, assignor to Hamlyn Overseas Trading Company Pty Ltd, Australia.

Filed Mar. 25, 1986, Ser. No. 843,778
Claims priority, application Australia, Sep. 13, 1985, PH2412
Int. Cl.[4] A47J *43/18*
U.S. Cl. 99—426 **7 Claims**



1. A foldable chicken holder, the holder comprising a bowl having a peripheral upstanding side wall, and only one pair of elongated "U" shaped members, each "U" shaped member having a leg laterally extending from each side, the leg being releasably clipped into and pivoted to the upstanding side wall, one "U" shaped member being displaced 90 degrees with respect to the other "U" shaped member, at least the other "U" shaped member having a notch at its upper extremity, the one "U" shaped member overlapping and engaging the other "U" shaped member at the notch at the upper extremity of the other "U" shaped member releasably to retain both the "U" shaped members in position, said members forming a central upstanding member so that when a chicken is placed over the member with the legs of the chicken extending into the bowl, the chicken is supported with the interior of the chicken open so that cooking can also take place from the interior due to the hot air passing thereinto, and basting of the chicken takes place due to the juices from the chicken collecting in the bowl, whereby the pair of "U" shaped members may be folded down into a flat position or be removed from the pivotal connection for cleaning or storage purposes.

4,709,627

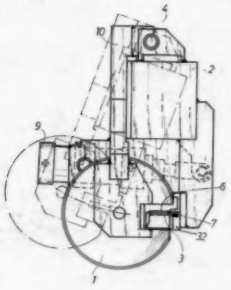
LOCKING SLEEVE MAGAZINE FEED ATTACHMENT FOR A DEVICE FOR SEALING STEEL WRAPPING BANDS

Wladyslaw Staszko, Duisburg, Fed. Rep. of Germany, assignor to ACME P.W. Lenzen GbmH & Co. KG, Fed. Rep. of Germany

Filed Jul. 30, 1986, Ser. No. 892,140
Claims priority, application Fed. Rep. of Germany, Aug. 2, 1985, 3527695
Int. Cl.[4] B65B *13/34*
U.S. Cl. 100—30 **9 Claims**

1. A locking sleeve magazine feed attachment on a device for mechanically sealing a steel wrapping band on filled packages having sheet metal tubes stored in the locking sleeve magazine, comprising conveyor means for removing the steel band from an associated storage bin and conveying it to and placing it around and tightening it on the filled package, a sealing device for notching the steel band edges surrounded by the sheet metal tube, a locking sleeve storage holder, a stop device acting on the advancing steel band ends which are positioned one behind the other, means for sealing the steel wrapping band which is first run twice through a first smooth, oval sheet metal tube stored in the sleeve magazine storage holder, steel band pass-through openings being provided for such purpose, the tube magazine being mounted on a stationary axle arranged in parallel to the feed direction of the steel band

and arranged to swivel horizontally to a limited extent, whereby in the first swivel position the first tube faces coaxially and in correct position with respect to the steel band to be fed through, and in the other swivel position the tube magazine is located externally of the steel band which is guided sideways



on the outside of the tube magazine which faces the second magazine swivel position in the direction of tube movement and extends parallel to the feed direction of the steel band, at least one tube magazine opening of the same size as a tube and a rigid tube buttress on the tube magazine for positioning the first tube in correct position in front of the said recess.

4,709,628

SCREW PRESS FOR DEWATERING SLUDGE AND FIBER SUSPENSIONS

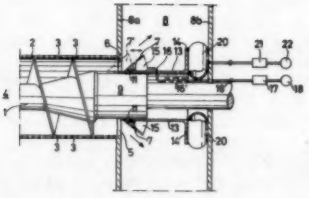
Tad Glowacki, Nälstaplan 7, 162 24 Vällingby, Sweden

Filed May 6, 1986, Ser. No. 860,234

Claims priority, application Sweden, May 10, 1985, 8502339

Int. Cl.[4] B30B *9/18*

U.S. Cl. 100—148 **5 Claims**



1. A screw press for dewatering sludge and fiber suspensions, comprising: a feed screw having an axis, a perforated drum surrounding the feed screw, an inlet aperture at one end of the drum and an annular outlet aperture located at the other end of the drum which includes a forward peripheral edge; said feed screw having an axial extension projecting through and coaxial with said other end of said drum, and an end-wall section of said annular outlet aperture comprising a plurality of flaps mounted coaxially relative to the extension of the feed screw, so that said flaps are yieldably arranged in a manner to enable the size of the outlet aperture to be adjusted, characterized in that: an attachment means (11) is provided, the end of each flap (7) located nearest the axis (9) of the feed screw (1) is pivotally mounted to said attachment means (11), and said attachment means (11) is arranged for displacement along the axis of the feed screw (1); a first force generating means mounted in structural association with said flaps, the flaps (7) being arranged to be pressed outwardly under the influence of said first force generating means (15,17,18) to form a larger angle with the screw axis (9), therewith to decrease the size of said outlet aperture (5); a second force generating means (20,21,22) in structural association with and enabling said attachment means (11) to be pressed axially towards the outlet aperture (5) under the influence of said second force generating means (20,21,22) thereby to decrease the size of said outlet aperture; and in that said first and said second force generating means can be adjusted independently of one another.

4,709,629

ROLL WITH PRESSURE CHAMBER FOR DETECTION CONTROL

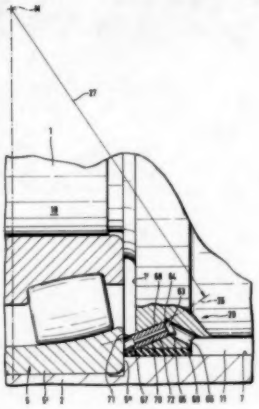
Valentin Appenzeller, deceased, late of Kempen; by Maria Appenzeller, heir, Kempen; by Regine Appenzeller, heir, Mitterfelden-Ainring; by Doris Pegels, heir, and by Ernst Appenzeller, heir, both of Krefeld, all of Fed. Rep. of Germany, assignors to Eduard Küsters, Krefeld, Fed. Rep. of Germany

Filed May 30, 1986, Ser. No. 870,446

Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519318

Int. Cl.[4] B30B *3/04*; F16C *13/02*

U.S. Cl. 100—162 B **18 Claims**



1. A deflection controlled roll juxtaposable to another roll to form a nip, said deflection controlled roll comprising:

a cylinder;

a crosshead longitudinally traversing said cylinder, said crosshead having an outer surface, said cylinder being rotatably mounted on said crosshead, said cylinder having an inner surface spaced from said outer surface of said crosshead;

a pair of longitudinal seals connected to said crosshead and slidably engaging said inner surface of said cylinder;

a pair of circumferentially extending transverse seals each having a radially inner side engaging said crosshead and a radially outer side slidably engaging a respective surface contiguous with said inner surface of said cylinder, said longitudinal seals and said transverse seals cooperating with each other, with an outer surface of said crosshead and with said inner surface of said cylinder to form a longitudinal chamber at the nip between the two rolls, said crosshead being provided with means including a conduit communicating with said longitudinal chamber for enabling pressurization of said longitudinal chamber with a pressure fluid; and

support means comprising a pair of bearings disposed at respective ends of said cylinder for rotatably supporting said cylinder on said crosshead, each of said bearings having a respective geometric center, each of said transverse seals having an annular abutment surface engaging a respective annular contact surface of said crosshead, the abutment surface of each of said transverse seals and the corresponding contact surface each having an orientation and shape conforming at least approximately to a spheri-

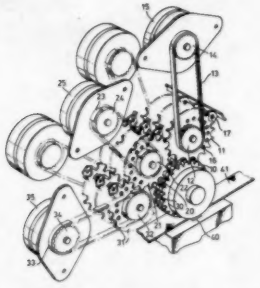
cal surface having a center at the geometric center of the one of said bearings disposed on a side of the respective transverse seal opposite said longitudinal chamber.

4,709,630

PRINTING WHEEL SETTING AND ALIGNING APPARATUS

David R. G. Wilkins, Wistaston; Reginald D. Brooker, Leonard Stanley; Roger Walker, Nantwich, and Harry Powell, Biddulph, all of England, assignors to McCorquodale Machine Systems Limited, Basingstoke, England

Continuation of Ser. No. 780,712, Sep. 26, 1985, abandoned, which is a continuation of Ser. No. 76,807, Sep. 18, 1979, abandoned. This application Jan. 21, 1987, Ser. No. 8,086
Int. Cl.[4] B41J *1/46*
U.S. Cl. 101—93.22 **4 Claims**



1. Printing apparatus for printing a line of characters comprising:

a plurality of toothed printing wheels having a common axis of rotation, each printing wheel having a set of type characters spaced around its periphery;

means defining a printing line, parallel to the said axis and containing a printing position for each printing wheel;

a plurality of setting wheels, one for each printing wheel, each setting wheel having a separate different axis of rotation and having teeth engaging in the spaces between the type faces of its printing wheel, the axes of rotation of the setting wheels being parallel to the said axis of the printing wheels and being arranged in an arc around the axis of the printing wheels;

a plurality of stepping motors, one for each printing wheel, each stepping motor having a driving shaft and a toothed wheel on the driving shaft, the axis of rotation of the stepping motors being spaced from one another about the axis of the printing wheels and being further than the setting wheel axes from the axis of the printing wheels;

a plurality of endless flexible transmission means, one coupling each stepping motor toothed wheel respectively to the corresponding setting wheel, whereby each stepping motor rotates the corresponding printing wheel to bring a selected character into the printing position;

an alignment bar having a portion for each printing wheel and being movable to cause each respective portion to engage in a slot in its printing wheel, such engagement of said portion and said slot being possible only if the corresponding printing wheel has a printing character in the printing position;

a print control means controlling the printing of a line of characters from the printing wheel; and

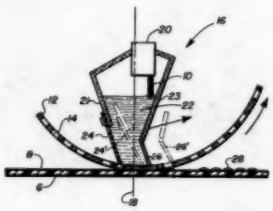
switching means, responsive to the engagement of all said portions of said alignment bar in their respective printing wheel slots to supply to said print control means a signal indicative of the print wheel alignment.

4,709,631

METHOD OF PRINTING A RAISED PATTERN OF LIQUID

Raymond G. Davey, Lancaster; Martin Dees, Jr., Landisville, and Daniel M. Sigman, Jr., Strasburg, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Jan. 20, 1987, Ser. No. 4,873
Int. Cl.[4] B41F *15/42*
U.S. Cl. 101—129 **1 Claim**



1. A method of printing a raised pattern on a substrate, said substrate being provided with a nonporous surface to receive a pseudo plastic thixotropic liquid that, at a first quantity of deposition will not have noticeable lateral flow and will yield a bead of liquid that will retain a geometric design the same as the print screen aperture, but at a second larger quantity of deposition will have noticeable lateral flow to have a number of beads of liquid flow together to form a different larger pattern of liquid due to the shear weight of the extra deposited liquid causing lateral flow, the steps comprising:

(a) providing a substrate to be printed with the substrate having a nonporous surface to receive the printed liquid;

(b) providing a printer with a circular screen having apertures therein of a desired design and size;

(c) positioning said screen tangent to and above said substrate;

(d) positioning within said screen a source of liquid which feed to a reservoir of liquid;

(e) retaining the reservoir of liquid within the screen at a first position directly above the point where the screen is tangent to the substrate so that a first quantity of liquid is deposited on the substrate and the amount of liquid deposited will yield a bead of liquid on the substrate that it retains a geometric design and size comparable to that of the aperture in the screen;

(f) moving the substrate and screen together in a continuous manner to deposit a plurality of beads of liquid onto the substrate while the screen and substrate are in contact;

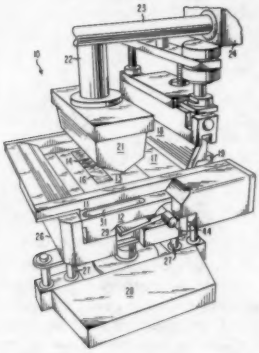
(g) moving the retained reservoir of liquid within the screen from its first position directly above the point where in the screen is tangent to the substrate, to a second position where the reservoir of liquid is offset, in the direction of screen movement; and

(h) moving the substrate and screen together in a continuous manner to deposit a plurality of beads of liquid of a larger quantity of liquid than would have been deposited when the reservoir was in its first position since deposition of liquid is occurring partly at the time the screen and substrate are not in contact so that the larger quantity of liquid is deposited and the liquid will have noticeable lateral flow to cause a number of beads of liquid to flow together to form a pattern of raised liquid larger than and of a different shape from the apertures of the screen.

4,709,632
SELECTIVE INTAGLIO INKING DEVICE WITH REMOVABLE CARTRIDGE

Gerard Samuels, Paoli, Pa., and Paul R. Smith, Chester, N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jan. 21, 1987, Ser. No. 5,808
Int. Cl.[4] B41M *1/10*; B41N *1/00*
U.S. Cl. 101—163 **14 Claims**



1. In an intaglio inking device including an inking surface having an aperture, a plurality of separately moveable substantially planar inking bars arranged in said aperture, each inking bar having a substantially flat edge portion spanning one dimension of said aperture, and moveable between a first position flush with said inking surface and a second position displaced from said inking surface whereby inking bars in said second position form cavities between inking bars in said first position, a frame member surrounding said inking surface and including an ink reservoir, means for spreading ink over said inking surface and said flat edge portions to fill said cavities with ink, means for removing ink from said inking surface and said flat edge portions leaving said cavities filled with ink, means for moving said inking bars between said first position and said second position, improvements wherein:

said inking bars are arranged in a removeable cartridge whereby said inking bars are alignable with and separable from said support member and from said means for moving;

and wherein said inking bars include a detent surface, said inking device further including stop bars for selectively engaging said detent surfaces whereby engaged inking bars are detented in said first position, first moving means for individually engaging said stop bars with said detent surfaces, second moving means for disengaging said stop bars from said detent surfaces, said stop bars being movably supported between said first moving means and said inking bars whereby said stop bars are moveable in a direction substantially normal to said inking bars, and said first moving means can each be effective in detenting two of said inking bars.

4,709,633
CIRCUIT FOR CONTROLLING THE INK LEVEL OF AN INTAGLIO PRINTING DEVICE

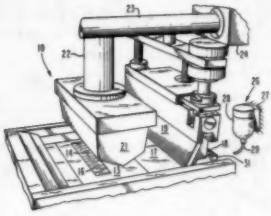
John W. Woestman, Lancaster, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 13, 1987, Ser. No. 37,896
Int. Cl.[4] B41F *1/16, 31/02*
U.S. Cl. 101—163 **11 Claims**

1. A control circuit for controlling a system for supplying ink to an intaglio printing device, said printing device having an inking surface with a set of moveable bars for setting a bar code arranged in said inking surface, an ink spreader for applying ink from a reservoir to said bars, an ink scraper for removing ink from said inking surface, an ink supply for supplying ink to said reservoir, a plurality of proximity switches associated with said ink supply for providing the level of ink in said ink supply to said control circuit; and means for transferring ink from said ink supply to said reservoir; said control circuit comprising:

sensor means associated with said ink scraper for sensing voids in the ink on said inking surface in the proximity of said moveable bars;

switch means responsive to said sensor means for actuating said control circuit;



generator means for energizing said means for transferring to effect transfer of ink from said supply to said reservoir in response to said sensor;

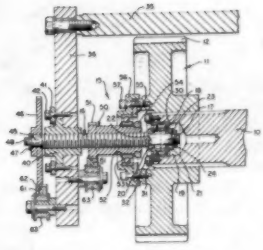
counter means responsive to said generator means, said counter means being set to a preselected count;

timer means responsive to said counter means, said timer means deactivating said generator means for a preselected time when said counter means reaches said preselected count whereby a preselected volume of ink is transferred to said reservoir, and whereby said means for transferring is disabled during said preselected time.

4,709,634
PLATE CYLINDER REGISTER CONTROL

Stanley Momot, La Grange, and William G. Hannon, Westchester, both of Ill., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Oct. 2, 1986, Ser. No. 914,430
Int. Cl.[4] B41F *13/12*
U.S. Cl. 101—248 **6 Claims**



1. In a rotary printing press having a set of side frame, a plate cylinder with journals for rotatably supporting the plate cylinder in said frames and a plate cylinder helical drive gear mounted on one of the journals to effect rotation of the plate cylinder, a lateral and circumferential register adjusting mechanism comprising:

(a) elongated operator means having external threads on the outer surface thereof supported at a first end within a bore formed in the plate cylinder journal carrying the cylinder drive gear for relative rotation with respect to the journal and supported on a second end within first internally threaded means fixed with respect to a press side frame;

(b) first drive means operably connected to said operator

means to effect rotation and simultaneous longitudinal movement thereof, whereby lateral movement of the plate cylinder is effected and adjustment of lateral register is accomplished;

(c) second internally threaded means disposed on and mating with the external threads on the outer surface of said elongated operator means;

(d) means operably connecting said internally threaded means to the plate cylinder drive gear; and

(e) second drive means operably connected to said second internally threaded means to effect rotation thereof, which rotation creates lateral forces in the plate cylinder drive gear that causes rotation thereof and effects adjustment of circumferential register.

4,709,635

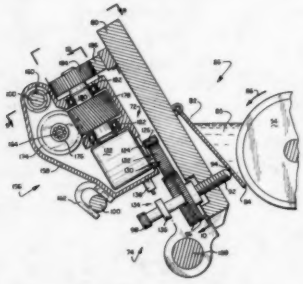
FLUID METERING METHOD AND APPARATUS

Vince T. Kubert, Indialantic, Fla., and John S. Richards, Arlington, Tex., assignors to Harris Graphics Corporation, Melbourne, Fla.

Continuation-in-part of Ser. No. 629,616, Jul. 11, 1984, abandoned. This application Apr. 14, 1986, Ser. No. 851,232

Int. Cl.[4] B41F *31/04, 33/16*

U.S. Cl. 101—426 **19 Claims**



1. A fluid metering apparatus comprising:

a fountain roll;

means for metering fluid on said fountain roll as said fountain roll rotates, said metering means including a flexible edge juxtaposed to said fountain roll;

a plurality of individually rotatable keys adjustably contacting said flexible edge at spaced locations therealong, rotational position of each key controlling spacing between an associated section of said flexible edge and said fountain roll, each key including a friction wheel fixed thereto;

a carriage mounted for movement along said keys;

first drive means for controlling movement of said carriage;

a drivable friction wheel carried by said carriage and positioned to individually engage the friction wheel of each key as said carriage moves therepast; and

second drive means for rotating said drivable friction wheel at (i) a speed and a direction synchronized with the movement of the carriage when passing a key not to be adjusted to roll over such key and (ii) a speed and direction when at a key to be adjusted to effect a desired spacing between the fountain roll and a section of the flexible edge associated with the key being adjusted.

4,709,636

PROPELLANT CHARGE CASING

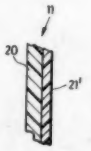
Dietmar Mueller, Karlsruhe, and Karlheinz Reinelt, Hermannsburg, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Sep. 21, 1984, Ser. No. 653,675

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1983, 3334026

Int. Cl.[4] F42B *5/18*

U.S. Cl. 102—431 **9 Claims**



1. An improved propellant charge casing for holding propellant charge powder in cartridge or artillery ammunition, wherein the propellant charge casing comprises an inner and an outer layer of synthetic foil material, said synthetic foil material is shrinkable at least one of said layers further comprises a mixture of at least one metal selected from the group consisting of magnesium boron and aluminum and at least one of the group consisting of lithium nitrate, lithium chlorate, sodium nitrate, sodium perchlorate, potassium nitrate, potassium perchlorate, ammonium nitrate, ammonium perchlorate, ammonium chlorate, hydrazine nitrate, organic peroxides, nitrile perchlorate, hexanitroethane, boron-potassium nitrate and zirconium barium nitrate.

4,709,637

TEMPERATURE SENSITIVE PYROTECHNICAL TRAIN INTERRUPTION DEVICE

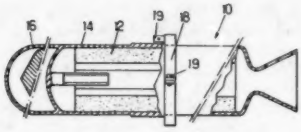
Henri Boggero, Velizy, France, assignor to Matra, Paris, France

Filed May 23, 1985, Ser. No. 737,167

Claims priority, application France, May 25, 1984, 84 08262

Int. Cl.[4] F42C *15/06, 15/20, 15/28*

U.S. Cl. 102—481 **7 Claims**



1. A unitary system for venting a rocket motor of an ordnance item carrying a warhead, comprising:

a circumferential belt containing a cutting explosive charge and constructed for removable mounting around a housing of said rocket motor,

and an activating device having:

a casing permanently connected to said belt,

primer means in said casing for energization of said explosive charge,

a striker mounted in said casing for movement therein,

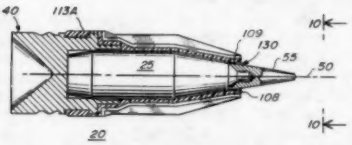
a spring means located in said casing and operatively associated wtih said striker for urging said striker toward said primer means from a rest position,

and latch means for retaining said striker in said rest position, said latch means including a part of eutectic alloy normally opposing movement of said striker, so located as to be in thermal balance with the ambient atmosphere and becoming ineffective above a predetermined melting temperature.

4,709,638
DISCARDING SABOT PROJECTILE

David E. Broden, Minnetonka; Wilford E. Martwick, New Hope, and John B. Warren, Wayzata, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 24, 1981, Ser. No. 305,077
Int. Cl.[4] F42B 13/16
U.S. Cl. 102—522 6 Claims

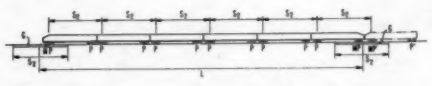


1. A low dispersion discarding sabot projectile comprising:
(a) a full calibre cylindrically shaped pusher of lightweight metallic material having a cup-like forward facing recess concentric with the external surface of said pusher, said cup-like forward facing recess of said pusher being stepped with the aft portion thereof being of slightly smaller diameter than the forward portion thereof;
(b) a cylindrically shaped subcalibre projectile of dense metallic material having:
(i) a rear portion adapted to be inserted into said forward facing recess of said pusher,
(ii) a main body portion projecting forward from said pusher, and
(iii) a forward tip portion having a surface thereof concentric with the longitudinal axis of said projectile;
(c) a discarding sabot of lightweight frangible material disposed around said main body portion, the forward portion of said sabot being
(i) in approximate radial register with said forward tip portion, and
(ii) spaced away from the external surface of said forward tip portionpiece, said sabot having external surfaces concentric with said primary axis and being adapted, after said projectile has accelerated down a gun barrel, to separate apart and away from said subcalibre projectile, said separation commencing at the forward portion of said sabot; and
(d) said apparatus being further characterized by said aft portion of said pusher recess being adapted to closely engage a short longitudinal portion of said subcalibre projectile.

4,709,639
RAILWAY SYSTEM UTILIZING A LINEAR MOTOR FOR PROPULSION OF TRAINS

Robert Geais, 10 rue Talma, Paris, 75016, France

Filed Oct. 28, 1985, Ser. No. 792,059
Claims priority, application France, Nov. 5, 1984, 84 16796
Int. Cl.[4] B61B 13/12
U.S. Cl. 104—292 10 Claims

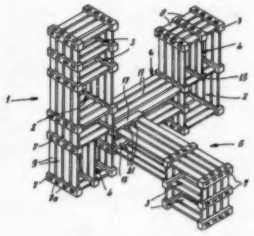


1. A railway system employing a discontinuous linear motor for train propulsion, comprising a train assembly formed with a plurality of transport units each including a group of vehicles ordinarily maintained coupled to one another, the transport units being joined end-to-end and all being of the same length L meters, the transport units also carrying secondary elements of said linear motor disposed at regular intervals such that the secondary of said linear motor is discontinuous, a track for operation of said train assembly thereon, said track having spaced active sections each equipped with a group of inductors which are disposed at regular intervals of L meters from center line to center line within each active section, the groups of inductors of said active sections constituting the primary of said linear motor and said active sections being separated from one another by inactive track sections having no primary inductors of said linear motor, such that during operation said train assembly will alternately occupy active and inactive sections of said track and thereby receive a propulsive force from said linear motor intermittently as said train assembly alternately passes through the active and inactive track section.

4,709,640
WOODEN MODULAR FURNITURE

Pierre Jouanin, 4, allee de la Venerie, Auffargis, Le Peray en Yvelines, France

Filed Feb. 26, 1986, Ser. No. 833,835
Int. Cl.[4] A47B 7/02
U.S. Cl. 108—91 8 Claims



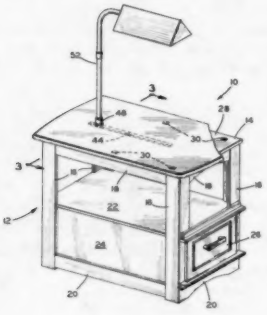
1. A piece of modular furniture formed as a plurality of side, top, and bottom panels having ends joined together with the side panels extending parallel to one another and perpendicular to the top and bottom panels and thereby forming therewith a plurality of parallelepipedal compartments in a furniture configuration, each panel being formed by:
at least one rectangularly parallepipedal and wooden coupling bar having a predetermined length and extending along a respective end of the respective panel, whereby each compartment is formed by a plurality of bars of the respective panels, each bar having a plurality of like longitudinally extending faces and being formed with a respective longitudinally extending and equispaced succession of like mortises opening perpendicularly at each face, the bars forming each compartment extending parallel to one another at the corners thereof; and
a group of like flat and wooden slats extending coplanar and parallel to one another and having ends received snugly in the respective mortises with the slats projecting perpendicularly from the respective bar face, the slats of each compartment extending perpendicularly between and interconnecting the bars at the corners of the respective compartment, at least one of the panels also comprising a wooden bar extending parallel to and of generally the same length as the respective coupling bar, each side having one side face formed with a succession of mortises identical to those of the coupling bar and receiving the ends of the respective slats and an opposite side face formed with an oppositely open longitudinal groove complementarily fittable over the longitudinal edge of a slat of another panel to join two of said compartments together.

4,709,641

ADJUSTABLE TABLE STRUCTURE

Sidney A. Lenger, Kernersville, N.C., assignor to The Pilliod Cabinet Company, Swanton, Ohio

Filed Aug. 18, 1986, Ser. No. 897,504
Int. Cl.[4] A47B *11/00*
U.S. Cl. 108—102 **1 Claim**



1. A table comprising:

a floor engaging base section, said section including a top structural member having an upwardly facing horizontally disposed surface and a downwardly facing horizontally disposed surface, the structural member in spaced relation above the supporting floor and having a slot formed therein;

a top member having an upwardly facing horizontally disposed supporting surface and a second downwardly facing surface disposed in facing relation to the upwardly facing surface of the top structural member of said base section;

guide means extending downwardly from said top member through the slot formed in the top structural member of said base section for attaching said top member to said base section and permitting movement of said top member relative to said base section along a path defined by the slot and including a mounting plate slidingly coupled to the downwardly facing surface of the top structural member of said base section for movement with said top member; and

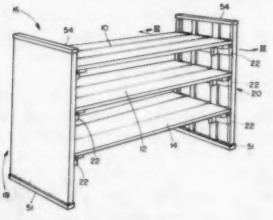
track means positioned between the mounting plate of said guide means and the top structural member of said base section to slidingly guide relative movement between the mounting plate and the top structural member.

4,709,642

SIMPLIFIED METALLIC STRUCTURES AND PROCEDURE FOR THEIR PRODUCTION

Antonello Briosi, V.le del Lavoro, 3, 38068 Rovereto, Italy

Filed Sep. 30, 1985, Ser. No. 782,209
Int. Cl.[4] A47B *3/00*; A47F *5/00*
U.S. Cl. 108—111 **3 Claims**



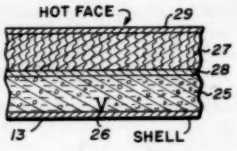
1. A shelf structure assembly comprising at least two vertical and at least one horizontal shelf, said vertical supports and said shelf being made of like modular members, said modular members having longitudinal dovetail projections, fixing means for anchoring said shelf to said vertical supports, said vertical supports and said shelf when assembled forming two right angle corners, said fixing means consisting of right angle components located in the corners between said vertical supports and said shelf, said right angle components having two arms, one arm supporting said shelf and the other arm adhering to each of the vertical supports when the shelf structure is assembled, each of said arms having cavities, a slot passing through each arm and into each cavity permitting each cavity to be elastically deformed, the cavities in one arm being perpendicular to the cavities in the other arm, each of said dovetail longitudinal projections having ends, said ends being anchored in said cavities when the shelf structure is assembled, said right angle components having longitudinal through-holes along the longest dimension thereof, tie rods being inserted in said through-holes when the shelf structure is assembled, whereby said right angle components are tightened around said projections as each cavity is deformed about each of said projections.

4,709,643

PRIMARY STAGE COMBUSTOR LINING

Frederick E. Moreno, Los Altos, and Creighton D. Hartman, San Francisco, both of Calif., assignors to PruTech II, San Jose, Calif.

Filed Feb. 24, 1987, Ser. No. 17,483
Int. Cl.[4] F23M *5/00*
U.S. Cl. 110—336 **17 Claims**



1. In a method for protecting the shell of a primary combustion chamber of a staged low NO_x burner for a thermally enhanced oil recovery steam generator, the steps of:

lining the interior of the primary combustion chamber of the staged low NO_x burner with a first layer of fibrous thermally insulative material comprised of ceramic fibers, said first layer of insulation material having a density falling within the range of 3 to 30 lbs. per cubic foot, and

lining the interior of said first layer of thermally insulative material with a coating of a tough, durable refractory material, whereby the thermal energy stored in the thermally insulative liner is reduced while reducing the weight of the insulative liner and while protecting the first fibrous insulative layer from the deleterious effects of the combustion processes.

4,709,644

SEWING MACHINE PRESSER FOOT LIFTING APPARATUS

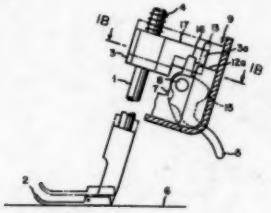
Masaaki Fujihara; Ikunori Fujii, and Shuji Fujita, all of Chofu, Japan, assignors to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan

Filed Jun. 18, 1986, Ser. No. 875,591
Claims priority, application Japan, Jun. 20, 1985, 60-135117; Jun. 20, 1985, 60-135118
Int. Cl.[4] D05B *29/00*
U.S. Cl. 112—237 **5 Claims**

1. In a presser foot lifting mechanism, wherein a presser bar with a presser foot at its lower and receives a continuous downwardly directed force and is in an operating position when pressing a workpiece against a machine bed and is in an

idle position when the presser foot is lifted and rotated outwardly around the longitudinal axis of said presser bar, a sewing machine presser foot lifting foot lifting apparatus, comprising:

a first means associated with a presser foot lifting lever for



preventing the presser foot from rotating outward when the presser foot is either in operating position or regardless of the level to which the presser foot is raised

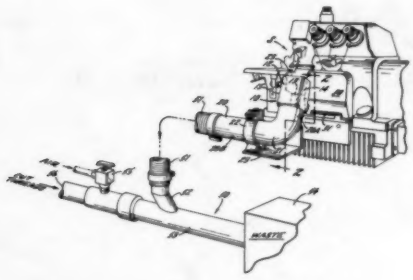
a second means associated with the rotation of the presser foot for preventing unintentional lowering of the presser foot when the presser foot is in said idle position.

4,709,645

WASTE FABRIC AND LINE COLLECTION BOX FOR A SEWING MACHINE

Christopher R. Jones, Greensboro, and Lee S. Jones, Jamestown, both of N.C., assignors to Templex, Inc., High Point, N.C.

Filed Nov. 24, 1986, Ser. No. 934,101
Int. Cl.[4] D05B *65/06*
U.S. Cl. 112—282 **9 Claims**



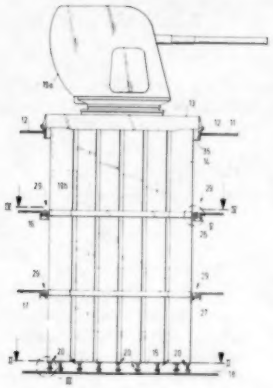
1. A waste and lint collector for collecting and conveying waste and lint away from a sewing machine having needles for sewing fabric and cutter knives for trimming away excess fabric, said waste and lint collector comprising an open top collection box communicatively connected with an inlet end of a waste conduit, said collection box of rectangular cross-sectional configuration and comprising a front wall, a rear wall and side walls, the tops of said walls defining an edge about the open top of the collector, said edge being shaped to sealingly fit against the frame of the sewing machine and to position the open top of the collection box in an operative position immediately beneath the cutter knives, and means for inducing a flow of air into the collection box from the area of the cutter knives, whereby trimmed fabric and lint is drawn into the collector box as it is generated and before it escapes into the atmosphere.

4,709,646

FUNCTIONAL UNIT INSTALLATION IN A WARSHIP

Karl-Otto Sadler, Hamburg; Willy Schmidt, Ellerbek, and Hans-Joachim Franz, Kölln-Reisiek, all of Fed. Rep. of Germany, assignors to Blohm & Voss AG, Hamburg, Fed. Rep. of Germany

Filed Jun. 21, 1985, Ser. No. 747,232
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1984, 3424067
Int. Cl.[4] B63G *1/00*
U.S. Cl. 114—5 **24 Claims**



1. A warship comprising:

a unit seating extending around an opening in a ship's deck,

a unit platform mounted in said seating and levelled relative to the said warship;

a functional unit installation mounted on and extending downwardly through said platform;

a unit container carried by said platform, beneath said platform, said unit container accommodating a part of said functional unit installation and extending downwardly beneath the ship's deck into the interior of the warship; and

spring means for supporting the bottom of said unit container;

said spring means comprising vertically resiliently acting means for supporting at least a part of the weight of said platform, said unit container and said functional unit installation; and

means underlying said spring means for supporting said spring means;

said spring means being horizontally deflectable to allow relative horizontal movement of said unit container and said support means in response to damage to said warship.

4,709,647

FLOATING DOCK

David H. Rytand, 2402 Killarney Way, S.E., Bellevue, Wash. 98004

Filed Jan. 6, 1986, Ser. No. 816,204
Int. Cl.[4] B63B *35/38*
U.S. Cl. 114—267 **18 Claims**

1. A floating dock, comprising:

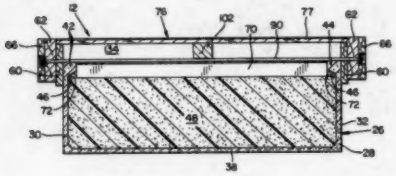
a plurality of aligned float modules having aligned opposed walls;

a deck having opposing edges in spaced relationship above opposing edges of said float modules;

a pair of wale means extending along and in engagement with each of said opposing walls of said float modules and said opposing edges of said deck; and

compression means above said float modules and below said

deck extending between and acting on said pair of wale means for exerting compression force on said float modules and deck whereby said float modules, deck, and wale means form a box beam type structure under compression.

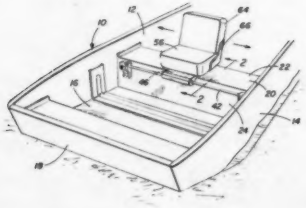


4,709,648

BOAT SEAT BRACKET

John R. Andrews, Jackson, Miss., assignor to Cullen Wayne Fugitt, Terry, Miss., a part interest

Filed Aug. 8, 1986, Ser. No. 894,833
Int. Cl.[4] B63B *17/00*
U.S. Cl. 114—363 **11 Claims**



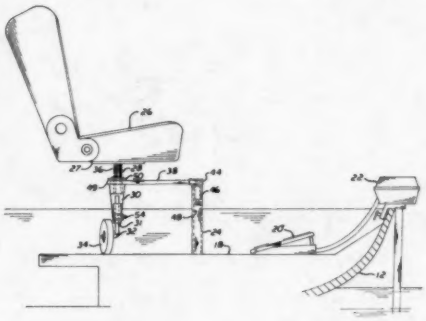
1. In combination with a boat of the type including opposite sides and an elongated bench seat extending lengthwise transversely of said boat at least substantially between said sides and including opposite side longitudinal margins, a seat assembly including a horizontal seat portion having front and rear marginal portions, said bench seat and seat assembly including coacting mounting means mounting said seat assembly from one of said margins with said seat assembly supported atop said bench seat for support therefrom and for guided sliding movement therealong throughout at least a major portion of the length of said bench seat, whereby said seat assembly may be guidingly shifted between positions adjacent the sides of said boat, said coacting means including pivot means swingably supporting said seat assembly from said one margin for angular displacement relative to said bench seat about an axis closely adjacent and paralleling said one margin and with said seat assembly being swingable generally 180° about said axis upwardly away from said bench salt, outwardly of said one margin and then downwardly to an inverted position disposed outwardly of said one margin and below the upper extremity of said bench seat, with an effective pivotal and sliding connection maintained between said seat assembly ar..l said one margin throughout the swinging of said seat assembly relative to said bench seat as well as the sliding of said seat assembly relative to said bench seat.

4,709,649

BASS BOAT ADJUSTABLE SEAT APPARATUS

Robert E. Wann, 1647 Hobbit Rd., Dunedin, Fla. 33528

Filed Jul. 31, 1986, Ser. No. 891,095
Int. Cl.[4] B63B *29/00*
U.S. Cl. 114—363 **6 Claims**



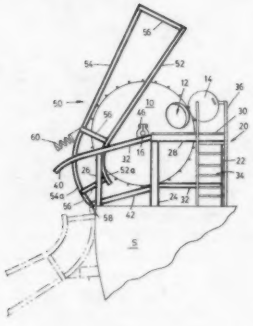
1. A fishing boat seat apparatus comprising:
(a) a pedestal securely mounted to a deck of the boat,
(b) a frame supporting a seat,
(c) a pair of shafts, each engaged to the frame at an upper end and in engagement with an element in contact with the deck at a lower end, the frame movable in a vertical direction with respect to the shafts,
(d) a U-shaped horizontal support element connecting the pedestal and the frame,
(e) the support element having an open end attached to a mounting element rotatably mounted on the pedestal and a closed end clamped to the frame, the frame movable in a horizontal direction within the horizontal support element by releasing a clamp plate.

4,709,650

RESCUE LAUNCHER

John W. Ingle, 85 Cynthia Road, Toronto, Ontario, Canada M6N 2P8

Filed May 9, 1985, Ser. No. 732,141
Claims priority, application Canada, May 11, 1984, 454191
Int. Cl.[4] B63B *23/28*
U.S. Cl. 114—375 **3 Claims**



1. A launching device for a rotatable rescue craft having a spherical exterior and comprising;
a base portion, for supporting said rescue craft;
a ramp portion on said base portion, ramp rail means on said ramp portion spaced apart a predetermined distance to engage said rescue craft, and located at a predetermined

height and defining a predetermined spacing therebeneath to receive and support said rescue craft therebetween, said ramp rail means being tilted at a predetermined launching angle, and adapted to procure initial movement of said rescue craft off said base portion, said base portion and said ramp portion being so dimensioned so that said rescue craft is located with a major portion of its mass on said ramp portion when in said storage position and releaseable means restraining it from such movement;

a chute portion, having inboard and outboard ends, said inboard end being pivotally mounted to said base portion in registration with said ramp portion, and said chute portion being swingable between a more or less upright storage position, with said outboard end directed upwardly, and a launching position, wherein said chute portion is swung outwardly and downwardly at a predetermined launching angle, with said outboard end directed outwardly from said ramp portion;

chute rail means on said chute portion spaced apart a lesser distance than said ramp rail means and being adapted to receive said rescue craft as the same moves off said ramp rail means, and to support said rescue craft for motion at a downward angle away from said base portion, and,

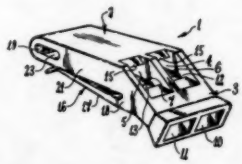
a second said chute portion movably connected to said first chute portion, and being extendable therefrom.

4,709,651

WHISTLE

Mark A. Lance, Melbourne, Australia, assignor to W.A. Deutsher Proprietary Limited, Moorabbin, Australia

Filed Aug. 13, 1986, Ser. No. 896,123
Claims priority, application Australia, Aug. 14, 1985, PH1937
Int. Cl.[4] G01K *5/00*
U.S. Cl. 116—137 R **3 Claims**



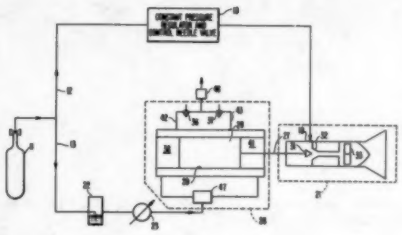
1. A whistle formed as a one-piece molding, comprising an elongated body having first and second lengthwise extending sound producing chambers arranged in a side-by-side contiguous relationship, an open mouth of each of said chambers being located at one end of said body, a closed end of each of said chambers being located at a second end of said body, said first chamber being substantially longer in length than said second chamber in order to permit said first and second chambers to simultaneously produce a sound in a low and high frequency range respectively, a mouthpiece extending angularly from said one end of said body, first and second open ended passages formed through said mouthpiece and arranged so that each passage has an inner end located adjacent the open mouth of a respective one of said chambers, each said passage being arranged so that a stream of air passing therethrough emerges from said inner end thereof to pass in a straight path across the adjacent open mouth of said respective one of said chambers, said path having a direction which is angularly disposed relative to a longitudinal direction of the respective one of said chambers, each passage of said mouthpiece thereby directing the produced sound of said respective one of said chambers forwardly of said elongate body, and said passages being arranged so that air blown into said mouthpiece passes simultaneously through each said passage, a clip formed integral with said elongate body and comprising a flat plate-like member which is attached to said body at said one end of said body to produce a resilient relationship between said body and said clip, and a cord attaching means provided in said elongated body comprising a third passage extending through the body in a direction transverse to said longitudinal direction of said chambers, said third passage being disposed adjacent said closed ends of said lengthwise extending chambers.

4,709,652

PNEUMATIC AUDIO SWEEP GENERATOR

Harold E. Douglass, Jr., Hanover, and Joseph W. Mahaffee, III, Bowie, both of Md., assignors to The United States of America as represented by the director of the National Security Agency, Washington, D.C.

Filed Jan. 16, 1985, Ser. No. 691,963
Int. Cl.[4] G10K *7/06*
U.S. Cl. 116—140 **11 Claims**



1. An audio apparatus, comprising:

air-actuated means for generating an audio tone, the volume of said tone being dependent upon the rate of air flow and the frequency of said tone being dependent upon the velocity of air flow;

a source of compressed air;

a first conduit connecting said air source and said generating means;

means within said first conduit for regulating the rate of air flow therethrough;

air-actuated means for varying the velocity of air passing through said generating means;

said air-actuated means having periodically varying means to fluctuate said rate of air flow and thereby sweep frequencies periodically;

a second conduit connecting said velocity varying means and said air source; and

means within said second conduit for regulating the pressure of air to said velocity-varying means.

4,709,653

MECHANICAL FLUID INDICATOR

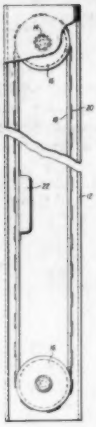
Lothar H. Salomon, 1813 Jack Frost Rd., Virginia Beach, Va. 23455

Filed Mar. 29, 1983, Ser. No. 466,892
Int. Cl.[4] G01F *23/30*
U.S. Cl. 116—228 **3 Claims**

1. In a mechanical fluid depth indicator for measuring the level of liquid held in a tank from the top of the tank of the type comprising a first pulley mounted at the top of the depth indicator and a second pulley mounted at the bottom of said depth indicator with an endless belt having a float and marking elements affixed thereto extending about the pulleys such that when the depth indicator is in a liquid the float will rise and fall with the liquid to thereby drive the belt about the pulleys and allow one to read the amount of liquid in the tank from the marking elements, the improvement wherein:

said fluid depth indicator further comprising a single tube extending its entire length, said tube having holes machined in its walls at both ends thereof and a first shaft means mounted in the holes at one end thereof and a second shaft means mounted in the holes at the other end

thereof, said first and second shaft means respectively rotatably mounting said first and second pulleys thereon



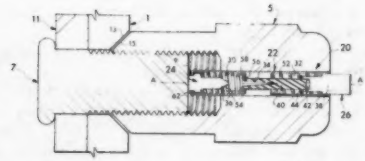
inside said tube so that said belt and its attachments are entirely inside said tube.

4,709,654

INDICATOR FOR LOOSE LUG NUTS

Stanley R. Smith, 8174 Tempest Ridge Way, Parker, Colo. 80134

Filed Aug. 15, 1986, Ser. No. 896,729
Int. Cl.[4] G01D *5/00*
U.S. Cl. 116—283 **13 Claims**



1. A device primarily intended for use as an indicator that an object such as a lug nut has come loose and moved away from a preferred tight position relative to another object such as a stud on an automobile axle, said device including:

a channel member having a channel therein extending along an axis,

a follower member dimensioned to be slideably received in said channel for movement relative to said channel member between a cocked position and an uncocked position,

an indicator member dimensioned to be slideably received in said channel for movement relative to said channel member between a cocked position and an uncocked position,

first means for biasing said follower member in a first direction toward its uncocked position,

second means for biasing said indicator member in a direction substantially opposite said first direction and toward its uncocked position, said follower member and said indicator member being farther apart from each other when in the respective uncocked positions than in the respective cocked positions and said follower member abutting against one of said objects and being moved against the force of the first biasing means to its cocked position when the objects are moved together into the preferred tight position,

said device further includes means for holding said indicator member in its cocked position against the force of the second biasing means when said follower member is in its cocked position and means for releasing said indicator member to move to its uncocked position under the force of the second biasing means when said follower member is moved under the force of the first biasing means away from its cocked position in response to said objects moving away from the preferred tight position whereby the indicator member is held in its cocked position when the two objects are in the preferred tight position and the indicator member is moved under the force of the second biasing means to its uncocked position when the two objects move apart, the movement of the indicator member to its uncocked position serving to indicate that the two objects have moved relative to each other away from the preferred tight position, and

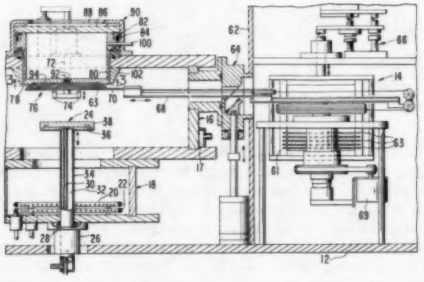
said channel in said channel member has two chambers spaced from each other along said axis with a passageway interconnecting the two chambers, said passageway being smaller than either chamber wherein at least a portion of said follower member is slideably received in one of said chambers as said follower member moves between its cocked and uncocked positions, at least a portion of said indicator member is slideably received in the other chamber as said indicator member moves between its cocked and uncocked position, and only a portion of one of said follower and indicator members is slideably received at any one time in said interconnecting passageway as said follower and indicator members move between their cocked and uncocked positions.

4,709,655

CHEMICAL VAPOR DEPOSITION APPARATUS

Max Van Mastrigt, San Jose, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed Dec. 3, 1985, Ser. No. 805,029
Int. Cl.[4] C23C *16/46, 16/50*
U.S. Cl. 118—719 **20 Claims**



1. An apparatus for chemical vapor deposition on a workpiece comprising:

a deposition reaction chamber;

a gas mixing chamber communicating with said deposition reaction chamber;

connection means for connecting a vacuum pumping means to said deposition reaction chamber;

gas distribution means for introducing gas into said gas mixing chamber;

adjustable baffle means between said gas mixing chamber and said deposition reaction chamber for controlling the flow of gas from said gas mixing chamber into said deposition reaction chamber, said adjustable baffle means including a generally flat thin body attached near the center of said flat thin body to a slender support;

chuck means for controlling the temperature of a workpiece, said chuck means being located within said deposition reaction chamber; and

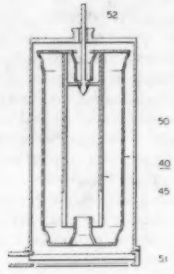
wafer holding means for holding a workpiece against said chuck means.

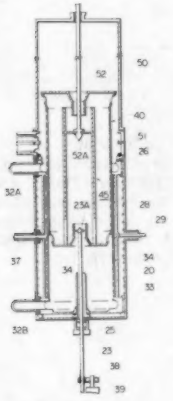
4,709,656

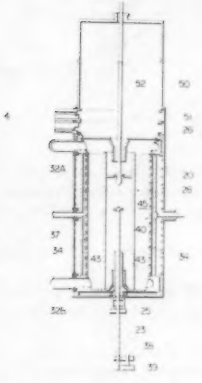
LAYER FORMING APPARATUS

Yasutomo Fujiyama, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 798,188
Claims priority, application Japan, Nov. 21, 1984, 59-244376
Int. Cl.[4] B05D *3/06*
U.S. Cl. 118—723 **1 Claim**







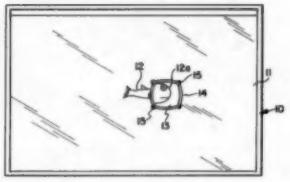
1. A layer forming apparatus comprising:
a conveyor chamber including:
a space for receiving a cassette, said cassette having means for receiving a substrate on which a film is to be formed;
loading means for inserting and removing the cassette in and out of the space in said conveyor chamber; and
first gate valve means for allowing the cassette to be inserted into or removed from the space in said conveyor chamber, and enabling said conveyor chamber to be sealed airtight; and
a film forming chamber including:
a space for receiving the cassette being defined by an interior surface wall of said film forming chamber, said interior surface constituting a wall electrode;
positioning means for positioning the cassette at a predetermined position in the space of said film forming chamber;
electrode means electrically connected to said wall electrode;
gas introduction means formed in said wall for introducing gas into said film forming chamber;
gas supply means connected to the gas introduction means for supplying reaction gas into the space formed in said film forming chamber; and
second gate valve means for allowing the cassette to be moved between said chambers while maintaining said film forming chamber airtight, the moving of said cassette between said conveyor chamber and said film forming chamber being perfored by opening said first and second gate valve means without allowing atmosphere to enter either chamber.

4,709,657

AQUATIC VIEWING SYSTEM

Patrick G. Gothard, Casper, Wyo., assignor to Aquarium Pharmaceuticals, Inc., Chalfont, Pa.

Filed Apr. 9, 1986, Ser. No. 849,878
Int. Cl.[4] A01K *63/00*
U.S. Cl. 119—5 **13 Claims**



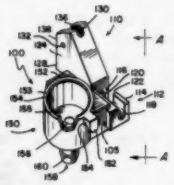
9. An aquatic viewing system for enabling a person to view magnified images of marine life contained in an aquarium, said aquatic viewing system comprising in combination:
(a) an aquarium having at least one transparent face, said aquarium containing an aqueous medium and marine life in said medium;
(b) a magnifying lens; and
(c) mounting means attached to the periphery of said lens; wherein said mounting means is adapted to be detachably mounted to said face of said aquarium;
wherein said magnifying lens is adapted to be moved to any desired viewing location on said face by detaching said mounting means from said face and re-positioning said mounting means and lens at said desired viewing location.

4,709,658

CAGE ANCHOR FOR WATERING DEVICE

Eldon Hostetler, Middlebury, Ind., assignor to Ziggity Systems, Inc., Middlebury, Ind.

Filed Jan. 4, 1985, Ser. No. 688,722
Int. Cl.[4] A01K *31/00*
U.S. Cl. 119—18 **33 Claims**



1. Means for supporting a watering device about first and second intersecting wire elements on an enclosure formed from a plurality of intersecting wire elements, comprising:

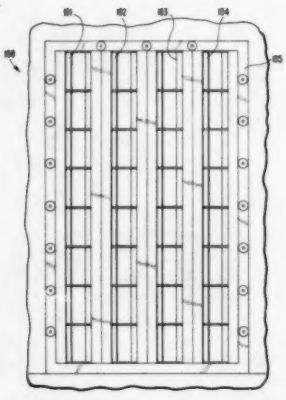
a retaining portion for receiving said first and second intersecting wire elements, said retaining portion including first wire engaging means for engaging said first wire element and second wire engaging means for engaging said second wire element, said second wire engaging means having at least two spaced apart slots with oppositely disposed openings for receiving said second wire element, said wire elements being received by said first and second wire engaging means in a cooperating manner with respect to said retaining portion so as to restrict motion of said watering device with respect to said enclosure.

4,709,659

BALLISTIC AND FORCED ENTRY RESISTANT BARRIER

Jeffrey B. Quante, III; Steven C. Scoggin; Dennis L. Maxwell, all of Montgomery; Marvin W. Rosenkoetter, Elmore, and James J. Ferencik, Prattville, all of Ala., assignors to Norment Industries, Inc., Montgomery, Ala.

Filed Sep. 30, 1985, Ser. No. 781,783
Int. Cl.[4] E06B *7/30*
U.S. Cl. 109—21.5 **18 Claims**



1. A forced entry and ballistic resistant barrier comprising a plurality of attached adjacent segments, each of said segments comprising:

a first pair of longitudinally elongated C-shaped channels positioned so that their concave sides are diametrically opposed;

a longitudinally elongated flat bar positioned between said first pair of C-shaped channels such that a first end portion of the width of said flat bar is surrounded by one of said channels, a second end portion of the width of said flat bar is surrounded by the other of said channels, and a central portion of the width of said flat bar which is not surrounded by either of said channels, thereby allowing the circulation of air from one side of said flat bar to the opposite side while prohibiting the passage of projectiles from one side to the other;

positioning means for rigidly positioning both said first pair of channels in said diametric position and said flat bar between said first pair of channels; and

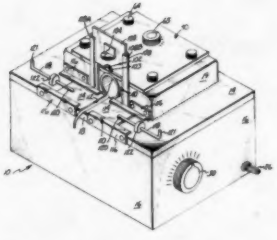
a second pair of longitudinally elongated C-shaped channels concentrically positioned about said first pair of C-shaped channels such that one channel of said second pair overlaps a convex portion of one channel of said first pair, and the other channel of said second pair overlaps a complementary convex portion of the other channel of said first pair, thereby allowing increased circulation of air from one side of said segment to the other, wherein said second pair of channels are rigidly positioned by said positioning means.

4,709,660

INSTRUMENT AND METHOD FOR ACCESSING VESSELS AND TISSUES WITHIN ANIMALS

William J. M. Hrushesky, Minneapolis, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Apr. 5, 1985, Ser. No. 720,423
Int. Cl.[4] A61D *3/00*
U.S. Cl. 119—103 **33 Claims**



15. A laboratory instrument to assist a technician in gaining access to vessels and tissues within a tail of an animal used for experimentation, comprising:

a base;

restrainer means mounted to the base for restraining movement of the animal;

window means positioned on the base adjacent to the restrainer means for supporting the tail and for propagating light to the tail;

light means mounted with respect to the window means for impinging light upon the window means to transilluminate the tail and make vessels and tissues therein visible; and

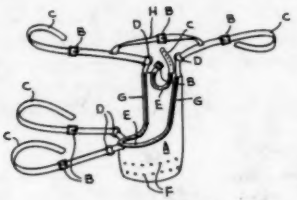
shutter means mounted with respect to the window means and forming an aperture through which light is propagated to the tail.

4,709,661

WASTE BAG

Johnny D. Mayle, Jr., Rte. 2, Box 217, Petersburg, W. Va. 26847

Filed Jul. 21, 1986, Ser. No. 847,040
Int. Cl.[4] A01K *23/00*
U.S. Cl. 119—95 7 Claims



1. A waste receptacle for attachment to a horse to collect solid waste excretions, said waste receptacle comprising:

a bag having a bottom portion and a back portion, said bottom portion having a generally cup-like configuration with an open top, said cup-like configuration having a forward side adapted for disposition between the horse's legs and under the horse's belly, and a rearward side, said back portion being integral with said bottom portion and extending generally upward from said rearward side of said bottom portion toward the tail of the horse, said back portion having an upper end and first and second generally vertically-extending edges;

reinforcement means for flexibly reinforcing said first and second edges of said back portion to permit said first and second edges to follow the contour of the horse's hips;

tail engaging means for securing the upper end of said back portion to the horse's tail;

first and second upper strap members secured to said back portions proximate said upper end and adapted to extend along opposite sides of the horse's back to engage a waistband secured about the horse's waist; and

third and fourth strap members secured proximate the forward side and open top of said bottom portion and adapted to extend from between the horse's legs along the horse's belly to engage the waistband.

4,709,662

FLUIDIZED BED HEAT GENERATOR AND METHOD OF OPERATION

Albert H. Rawdon, Shrewsbury, Mass., assignor to Riley Stoker Corporation, Worcester, Mass.

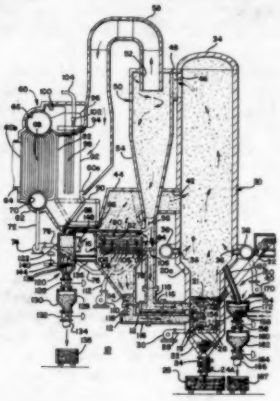
Filed Jan. 20, 1987, Ser. No. 5,114
Int. Cl.[4] F22B *1/02*
U.S. Cl. 122—4 D 21 Claims

1. In a heat generating system including a combustion vessel having a fluidized bed containing large size solid particles normally permanently residing therein for providing a dense, multi-size solids fluidized bed section and including recirculating solid particles of smaller size moving through said dense bed section, a source of fluidizing and combustion gas introduced into said vessel and discharged therefrom along with said recirculating smaller solid particles and a fuel injector for supplying fuel for combustion to generate heat absorbed by said solid particles in said vessel; the improvement comprising,

first separator means for removing said recirculating smaller size solid particles of a selected upper size range thereby preventing segregation of said upper size range particles in said dense bed section when a reduced flow rate of fluidizing gas is moving through said dense bed section at a reduced combustion load,

said large size particles of said dense bed section comprising particles having a size range of approximately 6000 microns to 15,000 microns and said recirculating smaller size particles having a size range of approximately 50 microns to 500 microns, and wherein

said first separator means is positioned remotely of said combustion vessel and includes means for removing solid



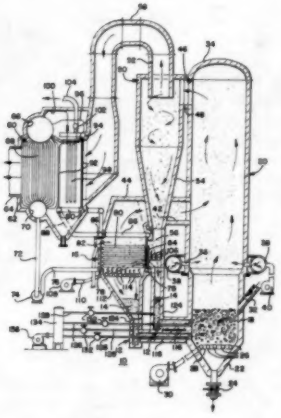
particles haivng a size range of approximately 500 miorons to 1000 microns from said recirculating smaller size particles to be recycled back to said dense bed section of said combustion vessel.

4,709,663

FLOW CONTROL DEVICE FOR SOLID PARTICULATE MATERIAL

John W. Larson, Sturbridge, and Ronald W. Breault, Paxton, both of Mass., assignors to Riley Stoker Corporation, Worcester, Mass.

Filed Dec. 9, 1986, Ser. No. 939,819
Int. Cl.[4] F22B *1/00*
U.S. Cl. 122—4 D 28 Claims



1. Flow control apparatus for feeding recycled particulate solid material into a fluidized bed combustion vessel, said apparatus comprising:

a generally horizontal material feeder conduit having an outlet end in communication with said fluidized bed combustion vessel and a receiving end remote from said vessel;

an upstanding material collector conduit having a lower end

in communication with said receiving end of said feeder conduit and an upper end for receiving a flow of said granular solid material to be recycled back into said combustion vessel, said upstanding collector conduit forming a standpipe adapted to retain a quantity of said granular solid material to establish a pressure sealing head of solid material extending in a column upwardly of said receiving end of said feed conduit; and

gas assisted flow initiating control means extending into said feeder conduit having a discharge outlet spaced between said outlet end of said feeder conduit and said receiving end thereof that is supplied with solid material from said standpipe for directing of a flow of pressurized gas into said solid material in said feeder conduit to fluidize the solid material for travel into said combustion vessel through said outlet end of said feeder conduit.

4,709,664

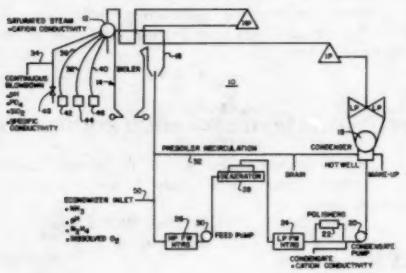
METHOD FOR DETERMINING THE EXISTENCE OF PHOSPHATE HIDEOUT

Ronald J. Barto, West Hartford; Stephen L. Goodstine, Windsor, and Frank A. Noto, East Windsor, all of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Nov. 3, 1986, Ser. No. 926,058

Int. Cl.[4] F22B *37/18, 37/48*

U.S. Cl. 122—379 **15 Claims**



1. A method for determining the existence of phosphate hideout in a steam generating steam cycle comprising the steps of:

a. determining from the concentration of PO_4 that is provided to the steam generating steam cycle the input of PO_4 to the steam generating steam cycle;

b. determining the loss of PO_4 from the steam generating steam cycle that is attributable to blowdown and solubility and contamination; and

c. determining whether phosphate hideout is present by comparing to the input of PO_4 to the steam generating steam cycle the loss of PO_4 from the steam generating steam cycle that is attributable to blowdown and solubility and contamination.

4,709,665

HIGH TEMPERATURE VIBRATION ISOLATING MOUNT

Michael E. Ewbank, Rockford, and Henry F. Johnson, Rockton, both of Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 22, 1986, Ser. No. 944,760

Int. Cl.[4] F22B *37/24*

U.S. Cl. 122—510 **9 Claims**

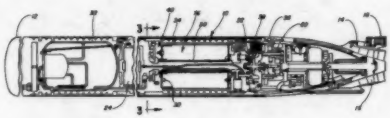
1. A vibration isolating mount for use in high temperature environments comprising:

a first element adapted to be connected to a source of radiant energy, said first element having a side adapted to face said source;

a first elastomeric pad secured to said side of said first element;

a second element adapted to be secured to a base and spaced from said first element sufficiently to be in non contacting relation therewith, said second element having a side adapted to face said source;

a second elastomeric pad secured to said side of said second element; and



an intermediate element having a first side facing said source and a second side facing said sides of said first and second elements and being spaced from both said elements sufficiently to be in non contacting relation therewith, said second side being secured to said pads so that said intermediate element and the first side thereof are interposed between said source and said pads to shade said pads from radiant energy from said source.

4,709,666

REGULATABLE FAN DRIVE

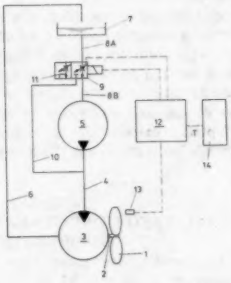
Johann Merz, Schwabisch Gmund, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, Ag., Friedrichshafen, Fed. Rep. of Germany

Filed Mar. 6, 1986, Ser. No. 836,982

Claims priority, application PCT Int'l Appl., Mar. 14, 1985, PCT/EP85/00104

Int. Cl.[4] F01P *5/04*

U.S. Cl. 123—41.12 **14 Claims**



1. A regulatable drive for the cooling fan (1) of an internal combustion engine/[14]comprising a tank (7) for holding a fluid, a pump (5) and a fluid motor (3) in sequential connection whereby fluid from said tank is pumped to said fluid motor for driving said fan, said pump having a suction side connecting to said tank and said fluid motor having a suction side connecting to the pressure outlet of said pump;

the improvement which comprises:

pump suction passage means (8A, 8B) from said tank to the suction side of said pump, and a regulatable valve means (9) in said pump suction passage means;

a fluid motor suction passage means (4) from the pressure outlet of said pump to the suction side of said fluid motor;

a bypass passage (10) connecting said latter passage means (4) to said regulatable valve means (9);

said regulatable valve means comprising movable control means (16) movable from a position to effect flow from said tank to the suction side of said pump and thence to said fluid motor to drive said fan, and in another position to bypass flow through said bypass passage from the

pressure outlet of said pump to therethrough via said regulatable valve means to regulate fan speed.

4,709,667

OIL SUPPLY DEVICE FOR VALVE OPERATING SYSTEM HAVING HYDRAULIC TAPPET IN INTERNAL COMBUSTION ENGINE

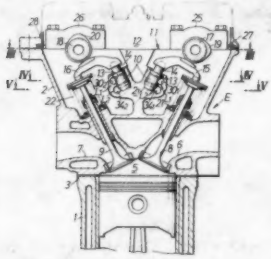
Eiichi Ichihara, Shakujii, and Itsuo Iwai, Shinminato, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo and Tanaka Machine Industries Co., Ltd., Toyama, both of, Japan

Filed May 13, 1986, Ser. No. 862,722

Claims priority, application Japan, May 14, 1985, 60-102057

Int. Cl.⁴ F01M *1/16*

U.S. Cl. 123—90.34 **11 Claims**



1. An oil supply device for a valve operating system having hydraulic tappets in an internal combustion engine, in which a combustion chamber and intake and exhaust ports communicating with the combustion chamber are formed in a cylinder head of an engine body, and valve operating cams for operating intake and exhaust valves for opening and closing the intake and exhaust ports are mounted on a valve operating cam shaft, and in which hydraulic tappets are incorporated in the interlocking portion between said valve operating cams and said intake and exhaust valves, wherein an oil supply line for supplying a working oil into said hydraulic tappet and a lubricating oil line for supplying lubricating oil to those portions of said valve operating cam shaft which are to be lubricated are juxtaposed in said cylinder head, and first and second flow rate control orifice means are respectively provided on the ways of said oil supply line and said lubricating oil line, said oil supply line and lubricating oil line being connected in a row to a main oil passageway connected to a source of a hydraulic oil upstream of said first and second orifice means, said cylinder head being securely connected on a cylinder block of said engine body by means of a head bolt, and said oil supply line has a oil supply passage communicating with said main oil passageway, and wherein said first orifice means is disposed with one end thereof engaged with a locking stepped portion formed in said oil supply passage and with the other end surface thereof faced to the outer surface of said head bolt.

4,709,668

SELF-ADJUSTING HYDRAULIC VALVE TAPPET

Horst Klug; Wolfgang Mocker; George Schaeffler, all of Herzogenaurach, and Walter Speil, Ingolstadt, all of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

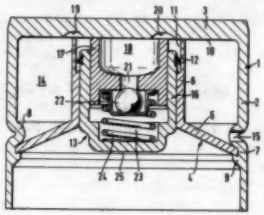
Continuation of Ser. No. 785,448, Oct. 5, 1985, abandoned. This application May 22, 1987, Ser. No. 53,087

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437478

Int. Cl.⁴ F01L *1/24*

U.S. Cl. 123—90.55 **11 Claims**

1. A self-adjusting hydraulic valve tappet arranged in a bore of a cylindrical guide bore of a cylinder head of an internal combustion engine, the tappet comprising a cup shaped housing comprised of a hollow cylindrical wall closed at one end by an end member against the outside of which a cam of a cam shaft abuts and a cylindrical guide sleeve concentric with the cylindrical wall and arranged in the center of an annular flange element which at its outer circumference merges into the cylindrical wall of the housing and defines an annular oil reservoir between the cylindrical wall, the end member, the cylindrical guide sleeve, and the annular flange element, the oil reservoir being supplied with oil through a bore leading to the



outside of the housing, a self-adjusting hydraulic play compensating element being guided for longitudinal movement in the guide sleeve and bearing with an end face opposite to the end member against the end of the valve stem, characterized in that the cylindrical guide sleeve and the annular flange element are made in one piece as a separate part and the cylindrical guide sleeve extends to the end member of the housing and contacts the inner face thereof, whereby the guide sleeve is supported and provides additional stability.

4,709,669

IGNITION ARRANGEMENT FOR AN INTERNAL COMBUSTION ENGINE OF A HANDHELD PORTABLE TOOL

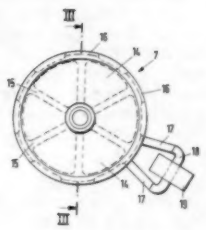
Michael Wissmann, Schorndorf-Weiler; Jürgen Weber, Waiblingen, and Hans Nickel, Cottenweiler, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Sep. 12, 1986, Ser. No. 907,045

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535477

Int. Cl.⁴ F02P *3/00*

U.S. Cl. 123—149 D **17 Claims**



1. An ignition arrangement for an internal combustion engine of a handheld portable tool, the engine having a crankshaft and the ignition arrangement comprising:

a permanent magnet having at least one pole shoe;

a fan wheel mounted on the crankshaft of the engine for rotation therewith and for generating a flow of cooling air for cooling the engine, the fan wheel including:

an annular metal supporting member mounted on the crankshaft of the engine for rotation therewith and extending radially from the crankshaft; and,

a plastic disc-like member mounted on said supporting mem-

ber and defining a plurality of vanes for generating said flow of cooling air;

said supporting member being made of ferromagnetic material and having a plurality of projections formed thereon and extending therefrom so as to pass said one pole shoe as the crankshaft rotates;

said projections and said permanent magnet conjointly defining a magnetic circuit wherein the flux varies as said projections pass said pole shoe; and,

igniting spark generating means operatively connected to said permanent magnet and responsive to the variations in said flux for generating a spark for the engine.

4,709,670

FASTENING ARRANGEMENT OF A COVER HOOD AT A CYLINDER HEAD

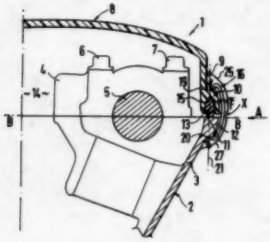
Herbert Ampferer, Bietigheim-Bissingen, Fed. Rep. of Germany, assignor to Dr. Ing.h.c.F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed May 29, 1986, Ser. No. 868,322

Claims priority, application Fed. Rep. of Germany, May 29, 1985, 3519205

Int. Cl.[4] F02F *7/00*

U.S. Cl. 123—195 C **18 Claims**



1. A fastening arrangement of a cover hood at a cylinder head of an internal combustion engine, comprising detachable retaining means, and seal means provided between sections of the cylinder head and of the cover hood which are placed adjacent one another, the retaining means being formed by spring clamps exhibiting mutually facing nose-shaped supports areas which apply resilient clamping forces in a clamping direction corresponding to a line through said nose-shaped support areas, said spring clamps being disposed such that the nose-shaped support areas engage in adjacent mounting recesses provided in substantially vertical boundary walls of the cover hood and of the cylinder head in such a manner that the clamping direction of action of the support areas of the spring clamps lies approximately on a vertical line that includes substantially a center line of the sections and of the sealing means.

4,709,671

OUTBOARD MOTOR PROVIDED WITH A FOUR-STROKE ENGINE

Yukio Sumigawa, Iwata, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

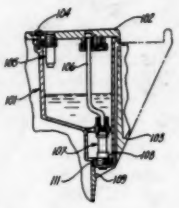
Division of Ser. No. 650,291, Sep. 12, 1984, Pat. No. 4,611,559. This application May 8, 1986, Ser. No. 860,848

Claims priority, application Japan, Sep. 13, 1983, 58-167425; Sep. 13, 1983, 58-167426

Int. Cl.[4] F01M *1/00*

U.S. Cl. 123—196 S **6 Claims**

1. In an outboard motor having a power head containing an internal combustion engine, a drive shaft housing depending from said power head, said drive shaft housing having an outer wall enclosing a drive shaft driven by said engine and a lower unit depending from said drive shaft housing and containing propulsion means driven by said drive shaft, the improvement comprising an oil reservoir formed by upstanding walls formed



integrally with said drive shaft housing outer wall for supplying lubricant to said engine.

4,709,672

COMBUSTION CHAMBER FOR AN INTERNAL-COMBUSTION ENGINE

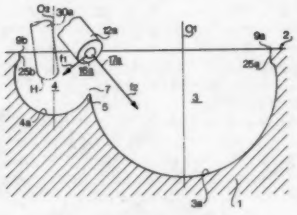
Shiro Ishida, Fujisawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed May 19, 1986, Ser. No. 864,673

Claims priority, application Japan, May 21, 1985, 60-106944; Nov. 29, 1985, 60-267401; Dec. 13, 1985, 60-278879

Int. Cl.[4] F02B *23/08*

U.S. Cl. 123—256 **35 Claims**



1. A combustion chamber for an internal-combustion engine, comprising:

a main combustion chamber defined by a first recess in the top surface of the crown of a piston;

an auxiliary combustion chamber defined by a second recess in the top surface of the crown of said piston beside said main combustion chamber, the volume of said auxiliary combustion chamber being smaller than the volume of said main combustion chamber;

a connecting part between said main combustion chamber and said auxiliary combustion chamber;

fuel injecting means disposed in said connecting part between said main combustion chamber and said auxiliary combustion chamber, and having an auxiliary nozzle hole for injecting fuel into said auxiliary combustion chamber during all running conditions of the engine, and a main nozzle hole for injecting fuel into said main combustion chamber only when the engine is operated under running heavier than a light engine load condition; and

ignition assisting means extending into said auxiliary combustion chamber for assisting in igniting the fuel.

4,709,673

FUEL INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES

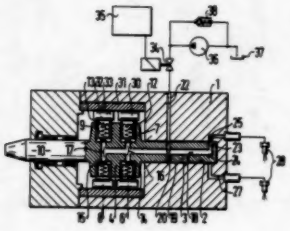
Rudolf Babitzka, Kirchberg, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 8, 1985, Ser. No. 763,595

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1984, 3437933

Int. Cl.[4] F02M *41/14*

U.S. Cl. 123—299 11 Claims



1. A fuel injection apparatus for internal combustion engines having a rotationally driven distributor supported in a distributor cylinder, at least one pump piston operative in a first pump cylinder arranged to enclose a first pump work chamber in said driven distributor and at least one second pump piston operative in a second pump cylinder arranged to enclose a second pump work chamber in said driven distributor, said first pump cylinder being located in a first radial plane and said second pump cylinder being located in a second radial plane with said pump cylinders angularly offset with respect to teach other, said distributor further having a first distributor opening and a second distributor opening positioned angularly relative to each other, said distributor openings adapted during the course of distributor rotation to coincide successively with injection lines which extend from said distributor cylinder to injection locations of said engine, said openings further arranged to communicate via pressure lines (**23**, **24**) in said distributor with one end of an axially extending distributor line **18** which communicates with said first pump work chamber (**14**) and said second work chamber (**15**) at its other end, each of said pump work chambers being connectable in succession via said one distributor line **18** and a common intake line in said distributor with a fuel supply line **22** provided with a metering device (**34**) in said fuel supply line, a cam ring (**31**) with radially arranged cams (**39**) that extend longitudinally of said cam ring in proximity to said at least one first and second pump pistons of said first and second pump cylinders, a pump drive mechanism **10** for rotation of said distributor and to generate in synchronism thereto a reciprocating movement of said pump pistons relative to said cam ring, and said pump pistons (**12**, **13**) are positioned angularly relative to each other such that the angular interval of the distributor openings (**24**, **26**) are such that said first pump piston (**12**) is actuated by the associated cams (**39**) by this angular interval offset from the actuation of said second pump piston (**13**).

4,709,674

SYSTEM FOR AUTOMATICALLY CONTROLLING THE IDLING SPEED OF AN INTERNAL COMBUSTION ENGINE

Valerio Bianchi, Crespellano, and Carlo Conticelli, Bologna, both of Italy, assignors to Weber S.p.A., Turin, Italy

Filed Jun. 9, 1986, Ser. No. 872,173

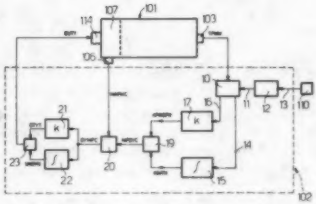
Claims priority, application Italy, Jun. 11, 1985, 67544 A/85

Int. Cl.[4] F02D *41/16*

U.S. Cl. 123—339 22 Claims

1. A system for automatically controlling the idling speed of an internal combustion engine (**101**) within an idling speed range, said system comprising a valve (**114**) for supplying an adjustable quantity of additional air, characterized by the fact that it comprises means (**102**) for controlling the setting of said valve (**114**) as a function of a detected speed of said engine (**101**) and comparison of the detected engine speed with an idling speed range, and further as a function of a detected pressure in an intake manifold (**107**) and comparison of the detected intake manifold pressure with a value equivalent to the required air supply

wherein said control means (**102**) comprises means (**29**) for detecting a deceleration rate of said engine (**101**) and for



thereafter calculating dynamic limits which exceed preset static limits of said idling speed range, said control means further comprising means (**31**) for determining whether said deceleration rate is below a given threshold value, or whether a mean speed over a predetermined number of previous strokes on said engine (**101**) is within said static limits of said range, and, if either condition is true, for saving said static range limits for future calculations, and otherwise saving said dynamic limits for future calculations.

4,709,675

GOVERNOR FOR SMALL SIZE VEHICLE

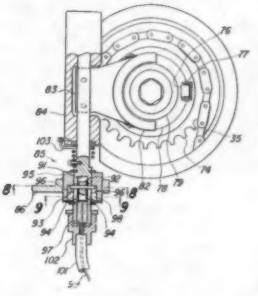
Minoru Fujita, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Mar. 11, 1986, Ser. No. 838,466

Claims priority, application Japan, Mar. 12, 1985, 60-47498; May 7, 1985, 60-95614

Int. Cl.[4] F02D *31/00*

U.S. Cl. 123—376 28 Claims



1. An overhead valve internal combustion engine having a cylinder block and a crankcase journalling an output shaft, a cylinder head affixed to said cylinder block, intake and exhaust valves carried by said cylinder head, an induction system including an intake port formed in said cylinder head and communicating with a combustion chamber through said intake valve, and means fixed to said cylinder head for supplying a charge to said intake port including speed control means operative to control engine speed, said speed control means

being positioned remotely from said engine output shaft and in proximity to said cylinder head, an auxiliary engine shaft journaled by said cylinder head and driven with said engine output shaft, governor means driven by said auxiliary engine shaft and providing a speed responsive signal, and linkage means operatively connecting said governor means to said speed control means for automatic speed control of said engine.

4,709,676

FUEL SUPPLY SYSTEM FOR TURBOCHARGED INTERNAL COMBUSTION ENGINE

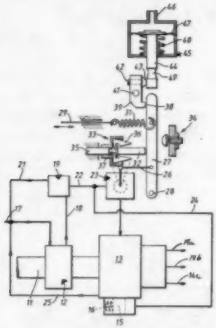
Michael L. Monaghan, Shoreham-By-Sea, England, assignor to Ricardo Consulting Engineers plc, West Sussex, England

Filed Apr. 15, 1986, Ser. No. 852,135

Claims priority, application United Kingdom, Apr. 15, 1985, 8509558

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—383 13 Claims



1. An improved fuel-supply system for a fuel-injected turbocharged internal-combustion engine, including means for improving acceleration response at low boost pressure with minimal smoking, said system comprising in combination: a fuel pump; a fuel distributor; a control valve; and fuel-injection timing means operably associated with said fuel distributor, for determining the timing of fuel distributed thereby; said means for improving acceleration response including a control unit and fluid-conduit means coupling said fuel pump to said fuel distributor via said control valve to convey combustion fuel serially therebetween; said fuel distributor being of a type to supply a predetermined quantity of fuel sequentially to individual injectors associated with individual cylinders of said engine under timing control by said injection timing means; means for sensing fuel pressure from said fuel pump and applying said pressure sense to said control unit, and for applying said pressure sense from said control unit to said fuel-injection timing device, for controlling the timing operation thereof by which fuel is supplied by said distributor to said injectors; said control unit including an actuating member; means for applying biasing forces to said actuator as a function of the amount of turbocharger boost pressure present and as a function of engine accelerator position; and means associated with said control unit and responsive to said actuator member, for modifying the fuel pressure sense applied to said injection timing device in response to said biasing forces in a manner causing retarding of the timing of the fuel injection to said engine when the latter is subjected to a demand for increased fuelling at boost pressure below a predetermined minimum level.

4,709,677

FUEL CONTROL SYSTEM FOR AIR-FUEL MIXTURE SUPPLY DEVICES

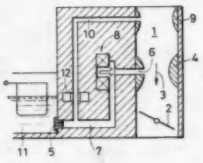
Tetsuo Muraji, Odawara, Japan, assignor to Mikuni Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 1, 1986, Ser. No. 880,877

Claims priority, application Japan, Jul. 5, 1985, 60-146627

Int. Cl.[4] F02M *7/18*

U.S. Cl. 123—438 16 Claims



1. A fuel control system for air-fuel mixture supply devices, comprising:

an intake mixture passageway having a first negative pressure generating section and a second negative pressure generating section disposed upstream of said first negative pressure generating section for generating a negative pressure weaker than that generated in said first negative pressure generating section;

a fuel passageway having its one end opening in said first negative pressure generating section of said intake mixture passageway and having its other end connected, via a fuel metering jet, to a fuel supply source;

a first electric fuel flow rate controlling means provided in association with said fuel passageway for controlling the flow rate of the fuel which should flow through said fuel passageway;

a negative pressure passageway having its one end opening into said second negative pressure generating section of said intake mixture passageway and having its other end connected to said fuel passageway at a site located between said fuel metering jet and said electric fuel flow rate controlling means; and

a level detecting means disposed at a site close to said negative pressure passageway and capable of generating an electric signal indicative of whether or not the level of the fuel column ascending through the negative pressure passageway is higher than a preset level by virtue of a difference between a fuel pressure in the region where said negative pressure passageway is connected to said fuel passageway and a negative pressure produced in said second negative pressure generating section,

said first fuel flow rate controlling means being operated by a signal generated by said level detecting means, in order to control the rate of flow of the fuel which is to be supplied into said intake mixture passageway from said fuel passageway.

4,709,678

UNCERTAINTY DETECTOR IN FEED-BACK CONTROL SYSTEM BASED ON COMBUSTION PEAK POSITION DATA FOR INTERNAL COMBUSTION ENGINE AND IGNITION TIMING CONTROL HAVING PARTICULAR DETECTOR

Shizuo Yagi, Asaka; Makoto Kawai, Tokorozawa, and Yorihisa Yamamoto, Shiki, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1986, Ser. No. 868,592

Claims priority, application Japan, May 31, 1985, 60-117769; Aug. 9, 1985, 60-175179

Int. Cl.[4] F02P *5/145*

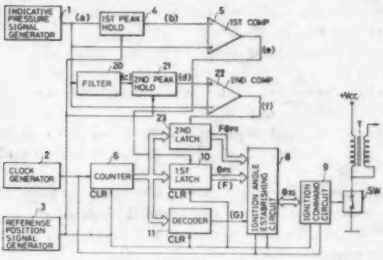
U.S. Cl. 123—425 13 Claims

1. In a feed-back control system for controlling an internal

combustion engine in response to an indicative pressure signal representing the inner pressure of the combustion chamber of the engine, the improvement which comprises:

a reference position pulse generator for producing a reference pulse at each time when the crank angle of the engine reaches a predetermined reference position;

a first peak detector for producing a first peak signal when a maximum peak appears in said indicative pressure signal;



a filter for eliminating noises contained in said indicative pressure signal;

a second peak detector for producing a second peak signal when a maximum peak appears in the filtered indicative pressure signal; and

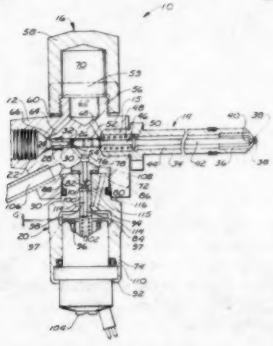
comparing means for comparing the crank angle at which said first and second peak signals occur so as to produce an uncertainty detection signal when said first and second peak signals appear at different crank angles.

4,709,679

MODULAR ACCUMULATOR INJECTOR

Ilija Djordjevic, Windsor, and Marco Ganser, Granby, both of Conn., assignors to Stanadyne, Inc., Windsor, Conn.

Filed Mar. 25, 1985, Ser. No. 715,354
Int. Cl.[4] E02M *39/00*
U.S. Cl. 123—447 **21 Claims**



1. An accumulator injector for a fuel injection system comprising:

body means forming a control chamber, a bleed passage from said control chamber, and an accumulator passage to receive fuel at rail pressure and transfer said fuel to said control chamber and said accumulator passage;

nozzle means mounted to said body means to receive pressurized fuel from said accumulator passage and to inject pressurized fuel, said nozzle means comprising discharge orifice means, a valve seat and an elongated valve needle engageable with said valve seat in response to pressure in said control chamber to prevent the passage of pressurized fuel through said discharge orifice means and momentarily axially displaceable from said seat for injecting pressurized fuel through said discharge orifice means;

auxiliary accumulator chamber means comprising a cap threadably removably mounted to said body means at the exterior thereof, said cap at least partially defining an auxiliary accumulator chamber communicating with said accumulator passage and said nozzle means to accumulate pressurized fuel;

adaptor means for removable mounting to said body means, said adaptor means forming a receiving cavity and fuel return means communicable with said bleed passage; and

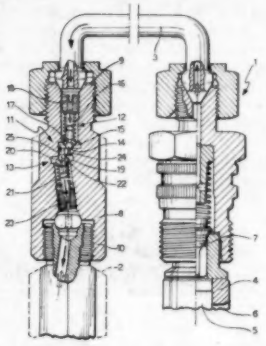
solenoid valve means received in said receiving cavity and mounted to said adaptor means to selectively vent said bleed passage for communication with said fuel return means so that energization of said solenoid valve means causes a release of pressure from said control chamber and the momentary axial displacement of said valve needle to inject a discrete charge of pressurized fuel through said discharge orifice means.

4,709,680

DEVICE FOR CONTROLLING FUEL INJECTION APPARATUS IN DIESEL ENGINES

Sergio Turchi, Rivalta, and Renato Filippi, Nichelino, both of Italy, assignors to Weber S.p.A. Azienda Altecna, Turin, Italy

Filed Jun. 23, 1986, Ser. No. 877,074
Claims priority, application Italy, Jul. 2, 1985, 53563/85[U]
Int. Cl.[4] F61M *39/00*
U.S. Cl. 123—467 **5 Claims**



1. Fuel injection apparatus for diesel engines, comprising an injection pump, an injector nozzle, and a device including valve means which connects the pump to the nozzle and is intended to maintain a residual pressure of a predetermined magnitude between the valve means and the injector nozzle between each injection cycle and the next, wherein the valve means comprise a valve body having first and second opposed chambers connected in series between said pump and said nozzle by two parallel orifices, a non-return valve located in each chamber for controlling a respective orifice the orifice associated with the non-return valve located nearer the pump is open at one side in communication with the inlet of the injector and is closed at its other side by the obturator of the respective non-return valve in the direction of flow of the injected fuel, and the orifice associated with the non-return valve located nearer the injector is open on one side in communication with the outlet of the injection pump and is closed on its other side by the obturator of the respective non-return valve in the direction opposite the flow of injected fuel.

4,709,681

FUEL INJECTION DEVICE

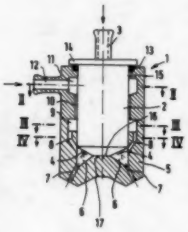
Tomas Rozsas, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagen AG, Wolfsburg, Fed. Rep. of Germany

Filed Feb. 19, 1987, Ser. No. 16,244

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1986, 3606918

Int. Cl.[4] F01B *25/08*

U.S. Cl. 123—531 **6 Claims**



1. A device for injection of a two-phase mixture composed of fuel and carrier air into intake pipes associated with individual cylinders of a multi-cylinder, mixture-compressing combustion engine, the device having carrier air apportioning means which apportions a carrier air current, branched off an intake manifold and conveyed by an air pump, to injection lines associated separately with the individual cylinders of the combustion engine and opening into the intake pipes thereof, and a fuel injection valve which injects fuel by way of separate injection nozzles into the individual injection lines, the carrier air apportioning means being provided with a carrier air collecting space formed in a housing containing the injection valve, said collecting space surrounding the injection valve in an annular manner so as to communicate, on the one hand, with the air pump and, on the other hand, with the injection lines, the device further comprising a carrier air reservoir provided between the carrier air collecting space and the injection lines so as to surround the injection valve in an annular manner, the carrier air reservoir communicating with the carrier air collecting space by means of a connecting line whose cross section is restricted.

4,709,682

DEVICE FOR CONTROLLING THE PRESSURE IN THE BEARINGS OF A ROOTS BLOWER SUPERCHARGER

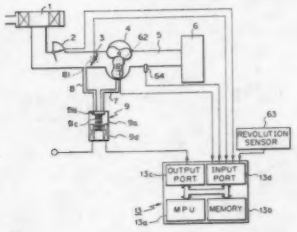
Kichiro Kato, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Nov. 20, 1986, Ser. No. 932,565

Claims priority, application Japan, Dec. 3, 1985, 60-270748

Int. Cl.[4] F02B *33/00*

U.S. Cl. 123—559 **7 Claims**



1. A pressure controlling device for controlling pressure acting on bearings provided in a Roots blower type supercharger mounted on an internal combustion engine, said supercharger having a housing formed with an inner wall to define a chamber therein, said bearings being provided in said housing and outside of said inner wall, two rotary shafts extending through said inner wall and provided with impellers which are housed in said chamber and mated with each other, said shafts being rotatably supported by said bearings, an annular sealing member being provided on an end face of at least one of said bearings to form an annular space between said at least one of said bearings and said inner wall, said annular space being communicated with the atmosphere through an air passage formed in said housing,

said pressure controlling device comprising;

a control valve connected to said air passage,

means for sensing an increase in load of said internal combustion engine, and

means for controlling said control valve to vary a flow passage area of said air passage according to said engine load,

said controlling means closing said valve to reduce said flow passage area for a predetermined period after said sensing means senses an engine load which is higher than a predetermined value.

4,709,683

INTERNAL COMBUSTION ENGINE WITH A POSITIVE DISPLACEMENT SUPERCHARGER MECHANICALLY DRIVEN FROM THE ENGINE CRANKSHAFT

Oskar Schatz, Tellhohe 14, D-8031 Stockdorf, Fed. Rep. of Germany

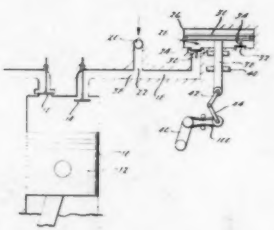
Continuation of Ser. No. 609,927, May 14, 1984, Pat. No. 4,643,156. This application Jun. 13, 1986, Ser. No. 874,116

Claims priority, application Fed. Rep. of Germany, May 18, 1983, 3318094; May 18, 1983, 3318113; May 18, 1983, 3318136

The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.

Int. Cl.[4] F02B *33/06*

U.S. Cl. 123—560 **3 Claims**



1. A positive displacement supercharger adapted for use with an internal combustion engine, comprising:

said supercharger having a chamber with an internally moving piston, wherein the displacement of said supercharger piston in said chamber is related to the maximum air requirement of one of the cylinders of said engine,

duct means for conducting air from said supercharger to said engine,

a mechanical drive for driving said supercharger in a timed relationship with said engine such that the motion of the pistons of said engine and said supercharger have a phase relationship such that pressurized air is supplied by said supercharger to said engine cylinder at a point in the operating cycle of said engine where the engine piston is near its bottom dead center position during the suction stroke, said duct means enabling atmospheric air to be drawn through said duct means during one portion of the suction stroke of said engine cylinder and pressurized air is provided by said supercharger during another portion of said suction stroke.

4,709,684

METHOD OF STABILIZING CURRENT FLOW THROUGH AN AUTOMOTIVE-TYPE IGNITION COIL

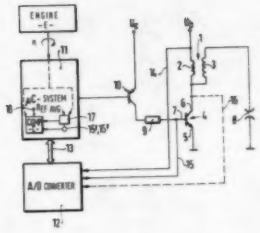
Günther Kaiser, Stuttgart, and Immanuel Krauter, Eibstetten, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 8, 1986, Ser. No. 861,156

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528103

Int. Cl.[4] F02P 3/12

U.S. Cl. 123—644 12 Claims



1. Method of stabilizing and controlling current flow through a primary winding (2) of an ignition coil (1), a secondary winding (3) of which is connected to a spark gap (8) of an internal combustion engine E, and

utilizing a switching transistor (4) serially connected to the primary winding and having a first main current path terminal (5), a second main current path terminal (6) and a control terminal (7),

and a control circuit (11, C, 17, 18) responsive to a control value (18, REF) connected to and controlling said switching transistor (4) for controlling current flow therethrough and through the ignition coil,

comprising the steps of

sensing the voltage across the first main current path terminal (5) and at least one (6, 7) other one of said terminals of the transistor (4), and deriving a sensed value;

sensing engine speed and deriving an engine speed value (n) representative of the speed of the engine; and

determining a control value for current flow through the main current path of the transistor (4) based on said sensed value:

(1) within a speed range of the engine (E) as determined by the engine speed value, in which current through the main current path of the transistor (4) rises from a value of at least approximately zero, at the ignition instant, indicative of essentially no residual stored electromagnetic energy in the ignition coil, in accordance with a predetermined reference value (18, REF); and

(2) within a speed range of the engine, as determined by the engine speed value, in which the current through the main current path of the transistor (4) rises from a value other than approximately zero, indicative of stored residual energy in the ignition coil, by comparison of said sensed value with said reference value (18, REF);

and, under condition (2), changing the duration of current flow through the primary winding (2) of the ignition coil based on and as a function of said comparison.

4,709,685

BALL THROWING DEVICE

Boris G. Kholin, Sumy, U.S.S.R., assignor to Sumsky Filial Kharkovskogo Politekhnicheskogo Instituta, Sumy, U.S.S.R.

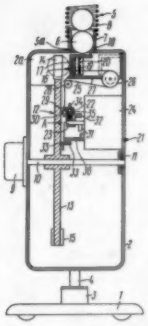
PCT No. PCT/SU84/00055, § 371 Date Jun. 6, 1986, § 102(e) Date Jun. 6, 1986, PCT Pub. No. WO86/02572, PCT Pub. Date May 9, 1986

PCT Filed Oct. 24, 1984, Ser. No. 878,378

Claims priority, application Canada, Apr. 19, 1985, 479629; France, Apr. 19, 1985, 85 05993

Int. Cl.[4] A63B 69/40

U.S. Cl. 124—7 6 Claims



1. A ball throwing device, comprising:

a separator (5) connected to a housing (2) and adapted for one-by-one delivery of balls (6);

a striker (12) fitted on a shaft (10) of a drive (9) for rotating said strike (12) in a plane perpendicular to said shaft (10), said shaft (10) being supported by said housing (2); and

a spring-actuated pusher (16) located at an exit opening (5a) of a separator (5) and adapted for displacing the balls (6) to a delivery position by virtue of a stroke, said pusher (16) being operatively associated with said striker (12) through a timing mechanism (21) which brings the motion of said pusher and said striker in synchronism;

said timing mechanism (21) comprising:

a crank (22) mechanically linked to said pusher (16) and mounted on an axle drive (23) of a drive (24) and arranged substantially parallel to said shaft (10) to rotate towards the direction of rotation thereof, said crank (22) being adapted for conjoint rotation with said drive axle (23) at the same speed, and also at a speed higher than that of said drive axle (23) when said pusher (16) causes the balls (6) to move into a stroke position, for which purpose projections (31, 32) are provided on said axle (23) and said crank (22) respectively, which projections being adapted to interact with each other, said striker being provided thereon with another projection (33), while said carnk (22) carries a spring actuated stop (34) adapted to interact with the projection (33);

a yoke (36) fixed on the housing of the drive (24) and arranged between the crank (22) and the shaft (10), said yoke (36) being adapted to interact with the spring-actuated stop (34), before the stop (34) interacts with said other projection (33) of said striker (12); and

the distance between the axis of the drive axle (23) and the inner surface of the yoke (36) varying from a length equal to the outside radius of the crank (22) with the spring-actuated stop extended, at the yoke front and facing the crank (22), to a length equal to the outside radius of the crank (22) with the spring-actuated stop (34) in a sunk position, at the yoke back end.

4,709,686

AIR WEAPON WITH GAS-TIGHT EXPANSION CHAMBER

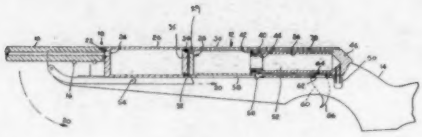
Hugh F. Taylor, Sawston, and David R. Theobald, St. Ives, both of United Kingdom, assignors to Utec B.V., DeLeersum, Netherlands

Continuation-in-part of Ser. No. 357,331, Mar. 11, 1982, abandoned. This application Nov. 16, 1983, Ser. No. 552,457

Claims priority, application United Kingdom, Oct. 1, 1980, 8031687; May 14, 1981, 8114842

Int. Cl.[4] F41B *11/00*

U.S. Cl. 124—67 **11 Claims**



1. An air weapon for launching a projectile by means of a charge of compressed air, said weapon comprising:

a barrel from which to launch said projectile;

an outer cylinder with an internal bore, said outer cylinder having a closed end and an open end, said open end being in communication with said barrel;

an inner cylinder with an internal bore and an outer wall, said inner cylinder located within said outer cylinder with a coaxial clearance, said inner cylinder having a closed end and an open end, said open end located between said outer wall of said inner cylinder and said internal bore of said outer cylinder of said inner cylinder being relatively closer to said barrel then said closed end of said inner cylinder;

a piston axially movably located within said outer cylinder between a cocked and an uncocked position, said piston having a piston crown and a cylindrical piston wall, said piston wall having an inner surface closed at the crown end of said piston and forming a piston interior, said piston interior being open at the end thereof opposite said crown end, said piston interior being in communication with the internal bore of said inner cylinder via said open end of said inner cylinder, said piston cooperating with said bore of said outer cylinder to form a piston and cylinder device capable of compressing a charge of air to expel said projectile, said piston wall extending axially into said coaxial clearance and being axially movable therein;

first annular sealing means between said piston wall inner surface and the outer wall of said inner cylinder to define a gas-tight expansion chamber defined by said internal bore of said inner cylinder and said piston interior, said expansion chamber being capable of being filled permanently with a charge of compressed gas; and

cocking means for retracting said piston toward said inner cylinder into said cocked position to compress gas in said expansion chamber, whereby upon release of said cocking means, said charge of compressed gas acts as a gas spring to force said piston into said uncocked position thereby compressing air before said piston crown to launch from said barrel said projectile.

4,709,687

GAS COOKERS

Hugh V. Barnes, Sutton Coldfield, England, assignor to TI Gas Spares Limited, London, England

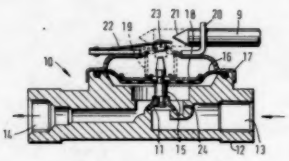
Filed Sep. 22, 1986, Ser. No. 909,633

Claims priority, application United Kingdom, Jun. 12, 1985, 8530060; Sep. 20, 1985, 8523248

Int. Cl.[4] F24C *3/12*

U.S. Cl. 126—42 **3 Claims**

1. A gas cooker comprising at least one gas burner, a lid or door movable between an open position giving access to the at least one burner and a closed position preventing access to the at least one burner, at least one tap for controlling the supply of gas to a respective burner and a gas control valve controlling the supply of gas to the at least one tap and operatively connected to the lid or door such that movement of the lid or door into its closed position opeates the gas control valve to terminate the supply of gas to the at least one tap, while lid or door movement from the closed to the open position restores the supply, the gas control valve including a first valve for controlling the supply of gas to the at least one tap, a valve



spindle on which the first valve is carried and which is operatively connected to said lid or door, a pressure operated surface means carried by said valve spindle and a responsive to gas pressure for maintaining said first valve closed when said lid or door is opened and said at least one tap is "ON", a weep passage by passing said first valve, and a further valve constituted in part by said pressure operated surface means for controlling the flow of gas through said weep passage whereby the flow of gas via said weep passage is prevented when said lid or door is closed.

4,709,688

OPEN CELL SHEETING

Roger O. Paradis, 998 Terranova Drive, Orleans, Ontario, Canada K1C 3K6

Filed Mar. 25, 1986, Ser. No. 843,582

Int. Cl.[4] F24J *3/02*

U.S. Cl. 126—415 **17 Claims**

1. A pool cover comprised of:

(a) a lower sheet of flexible, thermoplastic material, said lower sheet having upwardly-displaced dimples protruding therefrom, said dimples having upper ends and being crushable and adapted to rebound elastically, and being further adapted to contain air and provide flotation when the cover is deployed on the surface of a pool; and

(b) an upper sheet of flexible, thermoplastic material joined to said lower sheet at the upper ends of said protruding dimples.

4,709,689

SOLAR HEAT EXCHANGE SYSTEM

Allan W. Simcox, Las Vegas, Nev., assignor to Environmental Resources, Inc., Las Vegas, Nev.

Filed Dec. 2, 1986, Ser. No. 936,781

Int. Cl.[4] F24J *2/24*

U.S. Cl. 126—448 **18 Claims**

1. In combination

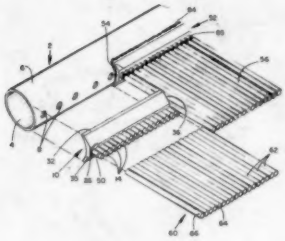
a header comprising a conduit having an exterior wall,

at least one aperture in the header wall,

a one-piece molded manifold having a base portion and a

plurality of aligned tube-connecting means extending therefrom,

channel means in a rear portion of the manifold communicating with the tube-connecting means,



the base portion having a rear surface adapted to conform to the exterior wall of the header and being affixed thereto such that the channel means communicates with the bore means, and

a plurality of aligned, longitudinally connected tubular elements attached to the tube-connecting means.

4,709,690

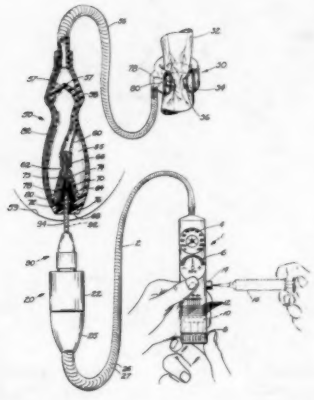
IMPLANTABLE BLOOD FLOW AND OCCLUSION PRESSURE SENSING SPHINCTERIC SYSTEM

Terry M. Haber, Lake Forest, Calif., assignor to Habley Medical Technology Corporation, Laguna Hills, Calif.

Filed Apr. 21, 1986, Ser. No. 853,963

Int. Cl.[4] A61F *1/00*

U.S. Cl. 128—1 R **25 Claims**



14. A sphincteric system including a hollow, inflatable occlusion cuff to be located around the urethra of an incontinent patient for occluding and relaxing the urethra to enable the patient to achieve continence, said sphincteric system comprising:

hyponometer means to be interconnected with said occlusion cuff so that said cuff can be percutaneously infused with or exfused of a measured supply of fluid, whereby to inflate or deflate said cuff and regulate occlusive pressure to the urethra;

transducer means located at said occlusion cuff to provide an output signal in response to the patient's blood flow through the urethra when said cuff is inflated and said urethra is occluded;

indicator means located at said hyponometer means and interconnected with said transducer means to receive the output signal therefrom and provide an indication when excessive occlusive pressure is applied to the urethra so as to interrupt the flow of blood therethrough; and

electro-fluidic path means located between said hyponometer means and said occlusion cuff and having a fluid circuit to convey fluid from said hyponometer means to said occlusion cuff and an electrical circuit to transmit the output signal of said transducer means to said indicator means at said hyponometer means.

4,709,691

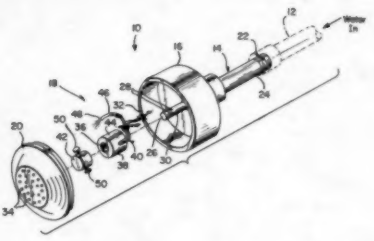
FULL BODY HYDROMASSAGER HAVING AN ECCENTRIC WEIGHT ROTOR

David H. Lemons, 1807 Elkhart Dr., Greensboro, N.C. 27408, and George Spector, 233 Broadway, Rm 3615, New York, N.Y. 10007

Filed Jun. 19, 1986, Ser. No. 875,939

Int. Cl.[4] A61H *9/00*

U.S. Cl. 128—66 **2 Claims**



1. A full body massager apparatus activated by water pressure from a water outlet which comprises:

(a) a flexible hose fluidily coupled to said water outlet;

(b) a hollow shaft with input and output ends having external threads at said input end and an opening with said outlet ports at output end, said input end coupled to said flexible hose;

(c) a cylindrical housing having an open side, said housing coupled to said hollow shaft with said output end extending therein;

(d) means for vibrating said apparatus by said water pressure, said vibrating means rotatably coupled to said output end over said outlet ports of said hollow shaft;

(e) an end bell having a plurality of holes therein, said end bell snaps onto said open side of said housing so that when said hollow shat is held by a hand said end bell can be rubbed over a persons body with said vibrating means activated by said water pressure from said water outlet in which said water pressure will cause a vigorous vibration massaging effect as water passes through said vibrating means out of said holes in said end bell to said persons body, wherein said vibrating means includes:

(f) a pair of bearings coupled onto said output end of said hollow shaft between said outlet ports;

(g) a rotor having a reservoir within, said rotor rotatably coupled onto said bearings;

(h) a elbow fitting with a curved jet tube portion having an orifice, said elbow fitting coupled through said reservoir of said rotor; and

(i) an end cap secured to said output end of said hollow shaft to seal said opening and allow said rotor to turn with said elbow fitting off center when said water exits said orifice thus causing vibration further comprising:

(j) said hollow shaft having a second set of external threads at said output end;

(k) said end cap having a well with internal threads therein;

(l) a compressible rubber gasket placed within said well of said end cap;

(m) said rotor having an annular raceway formed in the side adjacent to said end cap; and

(n) beaings formed on the side of said end cap adjacent said rotor so that when said end cap is threaded onto said threads of said output end of said hollow shaft, said gasket will seal said opening and said bearings will ride in said raceway allowing said rotor to turn with said elbow fitting off center when said water exits said orifice thus causing vibration.

4,709,692

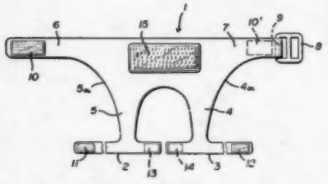
THIGH MOUNTED LOWER BACK SUPPORT BELT

Bruce H. Kirschenberg, 2811 Pine Island Rd. N., Sunrise, Fla. 33300, and Richard L. Platt, 1440 NE. 43rd Ct., Pompano Beach, Fla. 33064

Filed Jul. 2, 1986, Ser. No. 881,451

Int. Cl.[4] A61F *5/02*

U.S. Cl. 128—78 **2 Claims**



1. A lower back support to be worn by a person to urge the spine straight while allowing natural movement of the upper torso, said support comprising:

a pair of flexible left and right thigh straps constructed and arranged to be wrapped snugly around the person's corresponding thighs individually;

a pair of flexible left and right buttock straps extending up individually from said left and right thigh straps, respectively;

and a flexible hip belt consisting essentially of a back segment joined to the upper ends of said buttock straps and dimensioned to extend across the person's lower back, left and right front segments joined to the opposite sides of said back segment and dimensioned to extend across the front of the person and overlap each other at the person's navel, and manually releasable fastener means on said front segments for holding them overlapped;

said back segment of the hip belt having a subtantially greater vertical dimension for most of its extent from left to right than said front segments;

said hip belt being the top part of said lower back support and being unattached except to said thigh straps;

said lower back support having left and right outer edges respectively extending up along said buttock straps and diverging laterally outward from each other and upward along the bottom of said back segment and along the bottom of said front segments to pass over the top of the person's iliac crest.

said thigh straps, when the person's knees are bent, moving forward and pulling on said buttock straps to pull down on said back segment of the hip belt and pull back on said overlapped front segments of the hip belt for restraining the forward curvature of the person's spine.

4,709,693

BELT FOR ARTHROSCOPIC TREATMENT OF AN INJURED LEG SUPPORTED BY A SURGEON

James D. Key, 10 Medical Pkwy., Dallas, Tex. 75234-7895

Filed Feb. 10, 1986, Ser. No. 827,501

Int. Cl.[4] A61F *3/00*

U.S. Cl. 128—80 G **5 Claims**

1. A belt holder for the arthroscopic examination and treatment of an injured leg of a patient so as to leave both hands of a surgeon free by supporting said leg comprising a waist belt portion worn by said surgeon, and parallel perpendicularly attached straps to said belt for support of said injured leg around its calf and above its ankle.

4,709,694

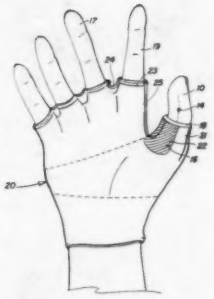
GLOVE-LIKE DYNAMIC SPLINT AND METHOD OF USING SAME

Bonnie O'Connell, 11 Dover Ln., Old Bethpage, N.Y. 11804

Filed Jul. 28, 1986, Ser. No. 890,908

Int. Cl.[4] A61F *5/10, 5/04*

U.S. Cl. 128—87 A **4 Claims**



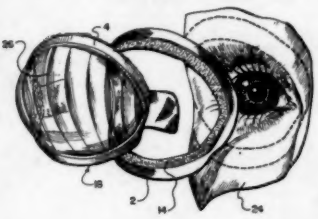
1. A dynamic splint for treating the hands of a person having a spastic condition causing thumb adduction and hyperextension comprising a covering made entirely of elastic stretch fabric material adapted for covering the palm and the back of the person's hand, said covering having at least one sleeve portion with an opening therethrough adapted for the thumb, said sleeve portion adapted for at least partly covering the metacarpal and proximal phalanx of the thumb, said covering including at least one web portion adapted for extending between the thumb and the index finger of the person's hand, and a pad connected to said covering and in a position adapted for engaging over the metacarpal-phalangeal joint of the thumb of the person's hand whereby the thumb is held in an abducted position, said covering including additional sleeve portions adapted for each finger of the person's hand and a collar of material adapted for engagement around the base of each finger of the person's hand, each collar having an accumulation of material.

4,709,695

PROTECTIVE DEVICE

Roger Kohn, 2920 "F" St. #C-17, Bakersfield, Calif. 93301, and William K. M. Shields, 20031 117th Ave. SE., Kent, Wash. 98031

Filed Mar. 27, 1986, Ser. No. 844,804
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—132 R 11 Claims



1. A protective device adhesively bindable to the skin of a patient for protectively enclosing a wound, the protective device comprising:

an adhesive base having an upper surface and a lower surface, the lower surface being coated with an adhesive for adhesively binding said adhesive base to the skin of the patient, said adhesive base forming a substantially closed loop for encircling the wound,

a protective covering for spanning over the wound and protectively enclosing the wound, said protective covering including a perimeter, and

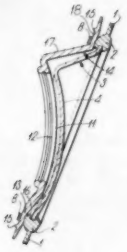
a means for securing said protective covering to said adhesive base, said securing means lying between the upper surface of said adhesive base and the perimeter of said protective covering, said securing means being of the type which can be repeatedly re-used and which enables said protective covering to be decoupled from said adhesive base without unbinding the adhesive base from the skin of the patient.

4,709,696

SIGHT CORRECTION ATTACHMENT FOR RESPIRATORS

Cyril N. E. Angell, Trowbridge, England, assignor to Avon Industrial Polymers Limited, Melksham, England

Filed Dec. 9, 1985, Ser. No. 806,463
Claims priority, application United Kingdom, Dec. 14, 1984, 8431592
Int. Cl.[4] A62B *10/08;* A61F *9/02*
U.S. Cl. 128—201.12 8 Claims



1. A mount means for receiving a sight corrective lens and attaching the sight corrective lens adjacent an eyepiece of a respirator having projecting apertured lugs of different widths, the mount means having projecting tabs of different widths, the tabs being for respectively engaging the apertures of the lugs whereby to maintain the lens in said mount means adjacent to the eyepiece in a unique orientation relative thereto.

4,709,697

TISSUE PNEUMATIC SEPARATOR STRUCTURE AND METHOD

George H. Muller, Ann Arbor, Mich., assignor to Joseph J. Berke, Detroit, Mich., a part interest

Continuation of Ser. No. 214,006, Dec. 9, 1980, abandoned, which is a continuation-in-part of Ser. No. 103,206, Dec. 13, 1979, Pat. No. 4,357,940. This application Nov. 21, 1983, Ser. No. 582,971
Int. Cl.[4] A61B *17/00*
U.S. Cl. 128—303 R 31 Claims

1. A tissue separator comprising a handle, a stem having a longitudinal axis secured to the handle, tip means retained on one end of the stem including blunt tissue separating means at one end thereof for mechanically separating tissue along natural cleavage planes without cutting of the tissue on nudging of the tissue with the tissue separating means, wherein the handle, stem and tip are hollow to provide for the flow of a fluid medium into the hollow handle, and wherein the tip is not fixed relative to the stem but is a floating tip and means for moving the floating tip axially relative to the stem in accordance with the pressure of the fluid medium acting in balance on the tip.

4,709,698

HEATABLE DILATION CATHETER

James H. Johnston, Jackson, Miss.; George D. Hermann, Palo Alto, and Tanya A. Atagi, Menlo Park, both of Calif., assignors to Thomas J. Fogarty, Palo Alto, Calif.

Filed May 14, 1986, Ser. No. 863,089
Int. Cl.[4] A61B *17/36*
U.S. Cl. 128—303.12 18 Claims

1. A heatable dilation catheter for simultaneously dilating and heating tissue within a vessel, the catheter comprising:

an inflatable balloon attached to the distal end of the catheter;

an elastic heating element mounted on the exterior of the balloon;

means for introducing fluid into the balloon to inflate the balloon such that the balloon expands to dilate the tissue and to bring the heating element into contact with the tissue; and

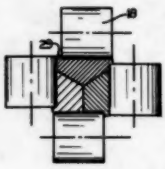
means for activating the elastic heating element to apply heat to the tissue.

4,709,699

SURGEON'S GIGLI SAW AND METHOD

Mark S. Michael, Garrett, and Scott A. Glaze, Ft. Wayne, both of Ind., assignors to Fort Wayne Metals Research Products Corporation, Fort Wayne, Ind.

Filed Aug. 6, 1986, Ser. No. 893,876
Int. Cl.[4] A61B 17/14
U.S. Cl. 128—317 27 Claims



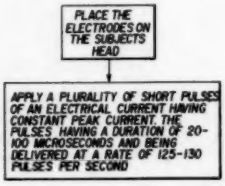
1. A surgeon's Gigli saw comprising, in combination:
a cable comprising a plurality of strands twisted together in a first rotational direction;
at least one strand of said cable having been previously twisted along its own axis in the opposite rotational direction from that of said cable; and
each strand comprising a plurality of wires substantially coined together into a generally polygonal cross-sectional shape.

4,709,700

ELECTRO CONVULSIVE THERAPY METHOD

Vaclav Hyrman, 2420 Norcrest Court, Burnaby, British Columbia, Canada C3J 1C6

Filed Mar. 11, 1985, Ser. No. 710,576
Int. Cl.[4] A61N 1/36
U.S. Cl. 128—421 3 Claims


PLACE THE ELECTRODES ON THE SUBJECTS HEAD
APPLY A PLURALITY OF SHORT PULSES OF AN ELECTRICAL CURRENT HAVING CONSTANT PEAK CURRENT. THE PULSES HAVING A DURATION OF 20-100 MICROSECONDS AND BEING DELIVERED AT A RATE OF 125-130 PULSES PER SECOND

1. A method for electro convulsive therapy comprising placing electrodes on the head of a subject and applying a plurality of short pulses of an electric current, said pulses having a duration of 20–100 microseconds and being delivered at a rate of 125 to 300 pulses per second.

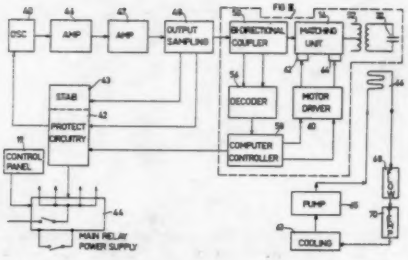
4,709,701

APPARATUS FOR MEDICAL TREATMENT BY HYPERTHERMIA

Raviv Weber, Herzliya, Israel, assignor to Medical Research & Development Associates, Potomac, Md.

Filed Apr. 14, 1986, Ser. No. 851,724
Int. Cl.[4] A61N 1/40
U.S. Cl. 128—422 2 Claims

1. A hyperthermia apparatus, comprising:
power amplifier means for providing a variable output power;
remote electrode means for receiving said output power provided by said power amplifier means and for coupling said output power across a capacitive load interacting with said remote electrode means, said capacitive load constituting portions of a patient to be treated;
power transmission means for electrically applying said output power provided by said power amplifier means to the remote electrode means;
capacitive matching means including a capacitive matching unit and step motor means for providing real time capacitive matching between the power amplifier means and the capacitive load across the electrode means; and
control means for governing the operation of the step motor means in accordance with real time sensing of reflected power from said electrode means,



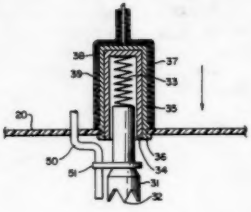
and wherein the control means comprises a bidirectional coupler, a decoder receiving an input from the bidirectional coupler and providing x and y coordinate indications of reflected power, and computer operated controller means for receiving the output of the decoder and providing operating instructions to the step motor means by means of Smith chart coordinates generated thereby, whereby the x and y coordinate indications provide direction indications to the step motor means to significantly reduce the real time required for capacitive matching.

4,709,702

ELECTROENCEPHALOGRAPHIC CAP

Gary W. Sherwin, South Huntingdon Township, Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 25, 1985, Ser. No. 727,031
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—644 20 Claims

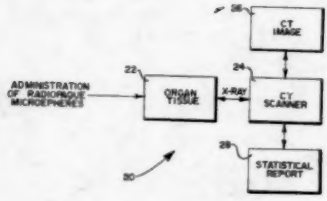


1. An electroencephalographic (EEG) electrode mounting cap for a patient's head having keratinous and epidermis layers of skin, comprising:
an adjustable freely movable headband adapted to be carried and supported by the head and adapted to tightly fit the head when adjusted; and
electrode means, attached to said headband at regions for measurement on the head, for electrically contacting the head in the regions for measurement and conducting EEG signals, said electrode means including stabilization means, adapted to be positioned substantially adjacent to the head, for mechanically stabilizing said electrode means, thereby mechanically stabilizing the electrical contact between the head and said electrode means.

4,709,703
IMAGING SYSTEM AND METHOD USING RADIOPAQUE MICROSPHERES FOR EVALUATION OF ORGAN TISSUE PERFUSION

Normand H. Lazarow, and Alfred A. Bove, both of Rochester, Minn., assignors to Mayo Foundation, Rochester, Minn.

Filed Nov. 12, 1985, Ser. No. 796,952
Int. Cl.[4] A61B 6/00, 5/02
U.S. Cl. 128—654 16 Claims



1. An imaging method for evaluating organ tissue perfusion, comprising the steps of:

(a) administering radiopaque microspheres to the organ tissue which become occluded in terminal capillary beds in the organ tissue;

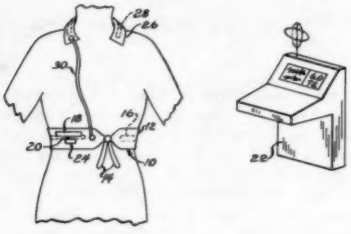
(b) subjecting the organ tissue to electromagnetic radiation; and

(c) measuring the electromagnetic radiation from selected regions of interest in the organ tissue, thereby quantitating the organ tissue perfusion in the selected regions of interest.

4,709,704
MONITORING DEVICE FOR BIO-SIGNALS

Mark Lukasiewicz, New City, N.Y., assignor to The Kendall Company, Walpole, Mass.

Continuation of Ser. No. 586,658, Mar. 6, 1984, abandoned. This application Aug. 26, 1986, Ser. No. 900,267
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—644 2 Claims



1. A portable bio-information monitoring device, comprising:

a signal processing unit for converting neck and abdominal electrode signals applied to a pair of inputs thereof to a single composite signal containing bio-information suitable for radio transmission thereof;

an FM radio transmitter having an input coupled to the output of the signal processing unit for transmitting radio waves containing the bio-information of the composite signal;

an open collar electrode assembly for producing a neck electrode signal including

an elongate, flexible open collar having an intermediate portion adapted to be held in a upright position against the back of the patient's neck when the patient is standing or sitting upright and elongate end portions at opposite sides thereof, said portions being of sufficient length to be drapable over and at least partially supportable by the opposite shoulders of the patient when the patient is standing or sitting upright and having free ends spaced from one another at the patient's throat to preclude any restriction of the patient's throat and to facilitate attachment and removal of the collar electrode assembly,

an elongate, flexible neck electrode carried by said open collar at an inner surface thereof for making electrical contact with a patient's neck, and

an elongate lead attached to the collar to be supported thereby and connected to the neck electrode, said lead having sufficient length for extending downwardly from the collar to the patient's abdominal area for connection with an input to said signal processing unit carried thereat; and

an abdominal belt electrode assembly for producing an abdominal electrode signal including,

an elongate, flexible abdominal belt of sufficient length for placement around a patient's abdominal region,

an elongate, flexible, belt electrode carried by said belt at an inside surface thereof for making electrical contact with a patient's back,

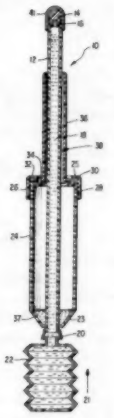
means for attaching the signal processing unit and the radio transmitter to the abdominal belt to be carried thereby with an input of the signal processing unit connected with the belt electrode, and

a connector connected with the elongate lead carried by the belt at an outside surface thereof and coupled to another input of the signal processing unit for connection of said other input with the neck electrode through said elongate lead.

4,709,705
LAVAGE DEVICE FOR OBTAINING A FLUID SPECIMEN FROM A BODY CAVITY FOR DISEASE DIAGNOSIS

Diana Truglio, Sayville, N.Y., assignor to Medtech Diagnostics Inc., New York, N.Y.

Continuation-in-part of Ser. No. 768,052, Aug. 22, 1985, abandoned. This application Jan. 30, 1987, Ser. No. 8,956
Int. Cl.[4] A61B 10/00
U.S. Cl. 128—750 15 Claims



1. A lavage device for obtaining a fluid specimen from a body cavity, said device comprising

a first member comprising

an elongated first tube having opposing first and second ends, said first end being insertable into a body cavity and said first tube having at least one lateral opening

close to said first end and capable of discharging a lavage medium radially therefrom; and

means forming a variable volume chamber for containing the lavage medium to irrigate the inside of the body cavity, said chamber being attached in sealing relationship to said second end of said first tube and communicating with the interior of said first tube; and

a second member comprising

means forming a collection chamber having opposing first and second ends, said first end having vents and said second end being mounted at, and in sealing relationship onto and around, said first tube near said means forming a variable volume; and

an elongated second tube having opposing first and second ends, said first end being open and said second tube being shorter than, concentric with, surrounding and radially spaced from said first tube, to define a passage therebetween for the lavage medium to reenter the device through said first end of said second tube when the lavage medium is expelled from the body cavity, said second tube being insertable into the body cavity, said first end of said second tube being positioned at a distance from said first end of said first tube, and said second end of said second tube being in flow communication with said first end of said means forming a collection chamber so as to transfer the lavage medium thereto.

4,709,706

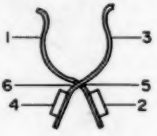
CIGARETTE HOLDER

Juan G. Turro, 1558 Sevilla Ave., Coral Gables, Fla. 33134

Filed Sep. 17, 1985, Ser. No. 777,082

Int. Cl.[4] A24F *13/08*

U.S. Cl. 131—240.1 **1 Claim**



1. A cigarette holder comprising two substantially shaped flat arms having formed midway in each arm a groove in the side of each arm wherein said flat arms are fitted together to form an X having a top and a base portion; a magnet included in each portion of said arms at said base wherein the arms at the base have a tendency to be drawn to each other and the arms at the top portion have a tendency to be drawn to each other and being so positioned so as to permit positioning of cigarette between the arms at the top portion.

4,709,707

USE OF 4,4A,5,6-TETRAHYDRO-7-METHYL-2-(3H) NAPHTHALENONE IN AUGMENTING OR ENHANCING THE AROMA OR TASTE OF SMOKING TOBACCO AND SMOKING TOBACCO ARTICLES

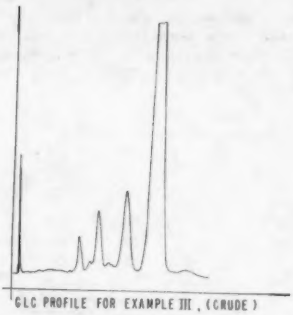
Alan O. Pittet, Atlantic Highlands; Ranya Muralidhara, Fair Haven, and Myrna L. Hagedorn, Edison, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

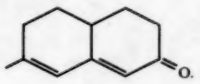
Division of Ser. No. 514,522, Jul. 18, 1982, which is a division of Ser. No. 368,640, Apr. 15, 1982, which is a continuation-in-part of Ser. No. 354,111, Apr. 2, 1982, abandoned. This application Oct. 17, 1986, Ser. No. 920,292

Int. Cl.[4] A24B *3/12, 15/30*

U.S. Cl. 131—276 **6 Claims**

1. A process for augmenting or enhancing the aroma or taste of a smoking tobacco composition comprising the step of adding to said smoking tobacco composition, an aroma or taste augmenting or enhancing quantity of 4,4A,5,6-tetrahydro-7-methyl-2-(3H)-naphthalenone having the structure:





4,709,708

CONTROL SYSTEM FOR HUMIDITY CONTROLLER OF TOBACCO LEAVES

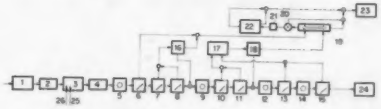
Kenichi Kagawa, Hiratsuka, Japan, assignor to The Japan Tobacco & Salt Public Corporation, Japan

Filed Jul. 12, 1984, Ser. No. 630,064

Claims priority, application Japan, Jul. 21, 1983, 58-131976

Int. Cl.[4] A24B *3/02, 3/04*

U.S. Cl. 131—302 **9 Claims**



1. A system for controlling the water content and temperature of tobacco leaves in a humidity controller comprising

(1) means for measuring the water content, temperature and flow rate of the tobacco leaves conveyed to the humidity controller which provides the tobacco leaves with the water content and temperature necessary for rib removal to maintain the quality of the tobacco leaves;

(2) operation means for calculating the amount of water and steam to be added upon the basis of the measurements of said measuring means and the preset values representative of the water content and temperature provided to the tobacco leaves and for compensating for deviation existing between a spraying position of water and steam and a position of measuring the water content and the temperature of the tobacco leaves which have been provided with water and steam and the time lag of rise up and fall of the water content and temperature when the preset values are changed; and

(3) control means for controlling means for supplying the water and steam in response to the values calculated by the operation means and for correcting the deviation between the measurements of the water content and temperature of the tobacco leaves provided with water content and steam and the preset values.

4,709,709

PROCESS FOR THE MOISTENING OF COMMINUTED SMOKING MATERIALS

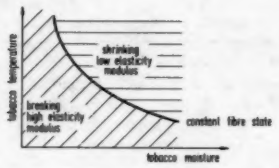
Gitta Jünemann; Werner Hirsch, both of Hamburg, and Arno Weiss, Delingsdorf, all of Fed. Rep. of Germany, assignors to B.A.T. Cigaretten-Fabriken GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 712,822, Mar. 18, 1985. This application Jan. 5, 1987, Ser. No. 4,214

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1984, 3410184

Int. Cl.[4] A24B *3/04, 3/12*

U.S. Cl. 131—306 7 Claims



1. A process for remoistening comminuted smoking materials overdried during expansion thereof by moistening and cooling said smoking materials while maintaining the same substantially in the constant fibre state which comprises:

(a) moistening said smoking materials, while in a free falling state by water droplets produced by ultrasonic atomizers, nad cooling said comminuted smoking materials while flowing them along supporting surface in incremental steps to cause said smoking materials to follow the functional curve of a constant fibre state arrived at by plotting smoking materials temperature and degree of moisture in said smoking materials;

(b) repeating said incremental steps until said smoking materials reach the desired temperature and moisture condition for further processing.

4,709,710

PROCESS FOR IMPROVING TOBACCO

Helmut Gaisch, Cormondreche, and Urs Nyffeler, Cortaillod, both of Switzerland, assignors to Fabriques De Tabac Reunies S.A., Neuchatel, Switzerland

Filed Sep. 5, 1978, Ser. No. 939,758

Int. Cl.[4] A24B *15/20, 15/24*

U.S. Cl. 131—308 9 Claims

1. A process for microbial reduction of the nitrate or nitrite content of tobacco comprising the steps of:

a. inoculating the tobacco with a pure culture of microorganisms selected from strains of *Enterobacter aerogenes* which derive their oxygen from the nitrates or nitrites in the tobacco and which are in their exponential growth phase;

b. incubating the inoculated tobacco with a nutrient solution under substantially anaerobic conditions for a period of time sufficient to degrade the nitrates or nitrites contained therein to a lower level; and

c. thereafter terminating the activity of the microorganisms.

4,709,711

CIGARETTE FILTER, METHOD AND APPARATUS FOR MAKING SAME

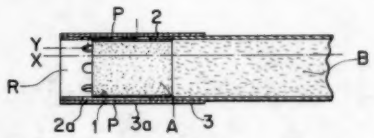
Ichiro Hirose, and Takayoshi Sagawa, both of Hiratsuka, Japan, assignors to The Japan Tobacco & Salt Public Corporation, Japan

Filed Feb. 17, 1984, Ser. No. 581,299

Claims priority, application Japan, Jul. 21, 1983, 58-131975

Int. Cl.[4] A24D *3/04*

U.S. Cl. 131—336 3 Claims



1. A cigarette filter for a cylindrical cigarette comprising:

a cylindrical filter having a suction end, a smoke inlet end and an outer surface between said ends;

a comparatively thin air impervious first plug paper wrapped around the outer surface of the filter to form an air impervious tubular cover for said filter, said first plug paper tubular cover having an outer diameter less than the outer diameter of the cylindrical cigarette to be connected to the smoke inlet end of the filter in an axial alignment therewith and having an end coplanar with said filter smoke inlet end to abut a smoke outlet end of the cigarette associated with the filter, whereby the filter is made impervious to air entering radially through said outer surface and pervious to smoke flowing axially of said cylindrical filter;

a comparatively thick second plug paper wrapped around the first plug paper to form a tubular case for said air impervious tubular cover, said tubular case having a plurality of axially extending channels, said second plug paper tubular case having an outer diameter substantially equal to that of the cylindrical cigarette and having an inlet end coplanar with said tubular cover first end and said filter smoke inlet end and abutting said cigarette smoke outlet end said first plug paper and said second plug paper being wrapped around said cylindrical filter and then all of just-mentioned elements cut off together to form a coplanar configuration between said filter smoke inlet end and said first plug paper end and said second plug paper inlet end; and

a tip paper wrapped around the second plug paper tubular case, said channels being operable as passages or air captured between the second plug paper tubular case and said tip paper and the smoke outlet end of the cigarette which is located adjacent to the filter, and said air passages being separated from smoke passages through the filter by said air impervious tubular cover.

4,709,712

POLYCARBOXYLIC ACID POLYMER GELS AS PROTECTIVE AGENTS

Michael J. Bordovsky, and John W. Feik, both of San Antonio, Tex., assignors to Dermatalogical Products of Texas, Fort Worth, Tex.

Filed Oct. 22, 1986, Ser. No. 921,496

Int. Cl.[4] A45D *7/00*

U.S. Cl. 132—7 8 Claims

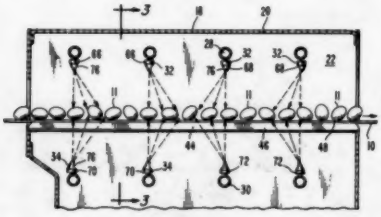
1. A method of protecting the scalp during hair treatment procedures involving the use of caustic solutions comprising first contacting exposed scalp with an aqueous gel of an acidic polymer gel having a pH of 4.5 to 5.5.

4,709,713

APPARATUS FOR CONVEYING AND WASHING MEANS THEREFOR

Henry Y. Kuhl, Kuhl Rd., P.O. Box 26, Flemington, N.J. 08822

Filed Jan. 21, 1986, Ser. No. 820,862
Int. Cl.[4] B08B 3/02
U.S. Cl. 134—72 7 Claims



7. An apparatus for conveying and washing means therefor, comprising:

(a) a conveying belt means comprising a plurality of wire members interlocking with and movable with respect to one another, each said wire member including:

(1) a central section extending approximately straight laterally across said conveying means perpendicularly with respect to the direction of movement of said conveying means;

(2) interlocking end means adapted to movably grip adjacent wire members to maintain a spatial distance between central sections of adjacent wire members of approximately one inch and allow pivotal movement between adjacent wire members for flexibility, said interlocking end means including a wire loop means defining an opening therethrough into which an adjacent wire means extends for providing of said interlocking means;

(b) a wash station for cleaning of said conveying belt means and articles randomly positioned thereon comprising:

(1) a wash housing means enclosing a portion of said conveying belt means and defining a washing chamber therein for enclosing and gathering cleaning solution sprayed toward said conveying belt means, said wash housing means defining an outlet means in the lower section thereof to allow used cleaning solution to exit from said wash housing means;

(2) a pump means for pumping cleaning solution into said washing chamber;

(3) an intake manifold means for receiving cleaning solution under pressure from said pump means and delivering same into an area adjacent to said conveying belt means, said intake manifold means including an upper manifold section extending across the upper surface of said conveying belt means and a lower manifold section extending across the under surface of said conveying belt means, said upper manifold section and said lower manifold section being in fluid flow communication with respect to said pump means to receive cleaning fluid therefrom;

(4) a plurality of upper nozzles mounted in said upper manifold section and extending downwardly therefrom, said upper nozzles being in fluid flow communication with respect to the cleaning solution within said upper manifold section for dispensing same in a downwardly direction onto said conveying belt means and any articles randomly positioned thereon, said upper nozzles including deflector means thereon for controlling the flow of cleaning solution, said upper nozzles including a first upper nozzle section and a second upper nozzle section, said first upper nozzle section having upper nozzles with said deflector means thereof oriented facing downstream with respect to the direction of movement of said conveyor means to facilitate cleaning of the bottom and rearmost areas of said conveyor belt means and any articles randomly positioned thereon, said second upper nozzle section having upper nozzles with said deflector means thereof oriented facing upstream with respect to the direction of movement of said conveyor means to facilitate cleaning of the bottom and frontmost areas of said conveyor belt means and any articles randomly positioned thereon;

(5) a plurality of lower nozzles mounted in said lower manifold section and extending upwardly therefrom, said lower nozzles being in fluid flow communication with respect to the cleaning solution within said lower manifold section for dispensing same in an upwardly direction onto said conveying belt means and any articles randomly positioned thereon, said lower nozzle including deflector means thereon for controlling flow of cleaning solution, said lower nozzles including a first lower nozzle section and a second lower nozzle section, said first lower nozzle section having lower nozzles with said deflector means nozzles oriented facing downstream with respect to the direction of movement of said conveyor means to facilitate cleaning of the bottom and rearmost areas of said conveyor belt means and any articles randomly positioned thereon, said second lower nozzle section having lower nozzles with said deflector means thereof oriented facing upstream with respect to the direction of movement of said conveyor means to facilitate cleaning of the bottom and frontmost areas of said conveyor belt means and any articles randomly positioned thereon;

(6) a drive means for operatively controlling said pump means;

(7) a tank means positioned below said outlet means of said wash housing means to receive and gather used cleaning solution therefrom;

(8) a return line in fluid flow communication with respect to said tank means and with respect to said pump means for supplying cleaning solution to said pump;

(9) a support means mounted within said wash housing means for supporting and guiding said conveying belt means while traveling through said wash station, said support means defining open channels through which cleaning solution can be directed by said lower nozzles for cleaning of the bottom of said conveying belt means and the bottoms of any articles randomly positioned thereon, said support means comprising three vertically extending plates including upper edges for supporting said conveying belt means and being spatially disposed with respect to one another for defining said open channels therebetween;

(10) a filter means positioned between said outlet means of said wash housing means and said tank means to filter the cleaning solution prior to being drawn into said return lines for reuse;

(c) a drying station positioned downstream from said wash station and enclosing said conveying belt means traveling therethrough, said drying station including:

(1) a drying housing means enclosing said conveying belt means;

(2) a blower means supplying forced air for drying of said conveying belt means and any articles randomly positioned thereon;

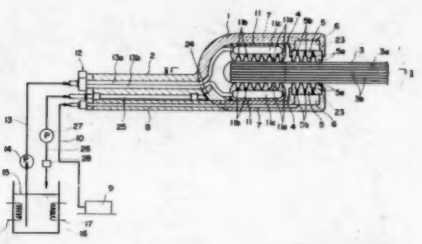
(3) an air manifold means for receiving forced air from said blower means and communicating same into said drying housing means adjacent to said conveying belt means; and

(4) an air dispensing means positioned within said drying housing means and in fluid flow communication with respect to said air manifold means for delivering forced air for drying into said conveying belt means and any articles randomly positioned thereon.

4,709,714
APPARATUS FOR EXPOSING FIBROUS REINFORCEMENTS OF FIBER REINFORCED RESIN BODY

Yoshinori Nishino, Yamatotakada; Masahiko Yamamoto, Nishinomiya; Tadayoshi Uda, Izumi; Kiyoshi Kondo, Itami; Yutaka Kondo, and Kazuo Kondo, both of Amagasaki, all of Japan, assignors to Hitachi Zosen Corporation, Japan

Filed Dec. 27, 1984, Ser. No. 686,843
Claims priority, application Japan, Aug. 6, 1984, 59-164469; Oct. 25, 1984, 59-225433
Int. Cl.[4] B08B *7/00, 7/02*
U.S. Cl. 134—89 **13 Claims**



1. An apparatus for exposing and cleaning the fibrous reinforcements of a fiber reinforced resin body comprising at least one processing unit including, a generally U-shaped main body with an open front end and open sides for laterally movably receiving an edge portion of the resin body, a pair of opposed liquid applicators arranged in the main body on both opposite walls thereof and adapted to slidably contact both sides of said edge portion of the resin body, each applicator having liquid jetting orifices on the side thereof opposing the other applicator, and means for alternately supplying a heated resin removing liquid to the applicators so that the liquid is jetted to said edge portion of the resin body alternately through the orifices of the respective applicators to cause the resin body to vibrate.

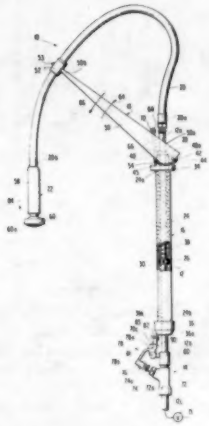
5. An apparatus for exposing and cleaning the fibrous reinforcements of a fiber reinforced resin body comprising, a first processing unit having means for heating a portion of the resin body, a second processing unit having first vibrator press means for roughly or coarsely cracking said portion of the resin body in a resin removing liquid, a third processing unit having second vibrator press means and means for jetting a heated resin removing liquid to said portion of the resin body so that said portion of the resin body is minutely or finely cracked, a fourth processing unit having ultrasonic cleaning means for roughly washing off the cracked resin matrix from said portion of the resin body in a heated resin removing liquid, a fifth processing unit having means for applying to said portion of the resin body a shower of a heated purified resin removing liquid so as to completely wash off the remaining cracked resin matrix, and means for transporting the resin body through said processing units.

4,709,715
RETRACTABLE PRE-RINSE UNIT WITH AUTOMATIC SHUTOFF

Silsby H. Knight, New Tripoli, Pa., assignor to Hayes-Ivy Manufacturing Inc., New Tripoli, Pa.

Filed Feb. 11, 1986, Ser. No. 828,402
Int. Cl.[4] B08B *3/00;* **B05B** *15/08*
U.S. Cl. 134—172 **9 Claims**

1. A retractable pre-rinse unit comprising a vertical upright tubular assembly comprising a fixed vertical internal riser pipe having upper and lower ends, an outer tube of a diameter in excess of that of said riser pipe, a normally closed water shutoff valve connected to said internal riser pipe at the lower end thereof for connecting to a source of water, means for mounting said outer tube concentrically on said vertical riser pipe above said shutoff valve for movement axially and for rotation about its axis on said riser pipe, a flexible hose fixably connected at one end coaxially to the upper end of said riser pipe, a spray head fixably coupled to the other end of said hose, means rotatably mounted to the upper end of said fixed vertical internal riser pipe for supporting said hose in arcuate, semi-loop form with said spray head pointing downwardly and to a side of said tubular assembly for raising and lowering said spray head parallel to said vertical upright tubular assembly and being spaced laterally therefrom, spring biasing means mounted externally of said internal riser pipe and operatively



engaging said outer tube for biasing said outer tube upwardly away from said valve, stop means carried by said vertical riser pipe for limiting vertical movement of said outer tube away from said valve, means responsive to outer tube movement axially on said vertical internal riser pipe toward said shutoff valve and against said spring biasing means for opening said normally closed shutoff valve, and cam means carried by said hose supporting means and operatively engaging said outer tube for effecting vertical movement of said outer tube on said riser pipe against the bias of said spring biasing means in response to manual pull down of the spray head to open said normally closed valve.

4,709,716
RINSE TANK

Russell G. Raush, and Raymond A. Alleman, both of Lancaster, Pa., assignors to RCA Corporation, Princeton, N.J.

Filed Sep. 16, 1986, Ser. No. 907,976
Int. Cl.[4] B08B *3/04*
U.S. Cl. 134—122 R **6 Claims**

1. A rinse tank for rinsing residue from fine apertures in a moving strip of material comprising:

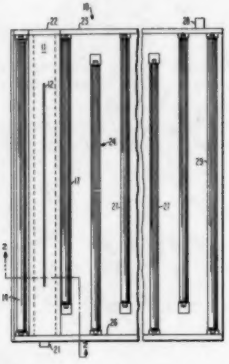
a chamber having an elongated slot for spanning said strip when said strip passes in the proximity of said chamber;

first fluid inlet means for providing fluid to said chamber whereby fluid exits said elongated slot as a fluid curtain substantially normal one side of said strip;

second liquid inlet means arranged in the proximity of said elongated slot for providing fluid to said tank and on the other side of said strip, said second fluid inlet means being positioned so that fluid exiting said second inlet means creates a fluid flow substantially parallel to said elongated slot whereby fluid flow into said fine apertures is enhanced and enhances the rinsing of residue form said apertures;

third fluid inlet means, spaced from said second fluid inlet means along the length of said rinse tank; and

a plurality of pairs of rollers for holding said strip beneath said fluid, said pairs of rollers being staggered between



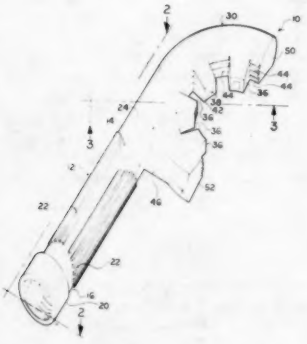
second and third fluid inlet means whereby fluid from said third inlet means follows a labyrinth path prior to joining fluid from said second fluid inlet means.

4,709,717

CLEANING APPARATUS FOR PAINT ROLLERS AND THE LIKE

Robert C. Rannigan, 5825 Lexington La., Earlysville, Va. 22936, and Gregory E. Webber, 13 Iroquois Trail, Ruckersville, Va. 22968

Filed May 9, 1986, Ser. No. 861,402
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—199 **9 Claims**



1. Cleaning apparatus for cleaning a paint roller and the like, said cleaning apparatus comprising:

A. a C-shaped cleaning head having a curved inner surface and an annular passage therein;

B. a plurality of spaced, generally radially inwardly extending nipples positioned circumferentially along the inner surface of said cleaning head, each of said nipples having an end face provided with a fluid outlet and having a fluid passage extending from the fluid outlet to said annular passage of said cleaning head; and

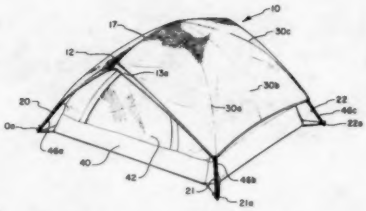
C. means for connecting said cleaning head to a cleaning fluid source to supply cleaning fluid to said annular passage and the fluid passages of said nipples, the curved inner surface of said cleaning head having a size and shape similar to that of the exterior of the roller to be cleaned, and said nipples being closely spaced and of sufficient length to penetrate the roller when it is brought into contact with said cleaning head, whereby cleaning fluid can be conveyed to the roller beneath the outer surface thereof through the fluid passages of said nipples.

4,709,718

TENT FLY APPARATUS AND METHOD

Nichols, Philip T., 4399 Walter Way, West Valley City, Utah 84120

Continuation-in-part of Ser. No. 732,494, May 9, 1985, abandoned. This application May 8, 1986, Ser. No. 861,062
Int. Cl.[4] A45F *1/16*; E04B *1/347*
U.S. Cl. 135—106 **11 Claims**



1. A mountable and demountable rain fly system for a tent comprising:

a single spar, said spar being formed from a plurality of hollow sections releasably mountable end-to-end into joints to form said spar and including an elastic means passing through said hollow sections to releasably hold said hollow sections in said end-to-end relationship to form said spar;

mounting means on said spar for removably mounting said spar to said tent;

a rain fly comprising a fabric sheet mounted to said spar to form said rain fly as a single unit, said fabric sheet being mounted over said spar and having a plurality of spar-receiving sleeves, said sleeves having a plurality of openings, said openings corresponding to said joints in said spar to permit separation of said hollow sections;

slack means in said rain fly to accommodate separation of said joints; and

securement means for releasably securing said rain fly system to said tent when said mounting means is mounted to said tent.

4,709,719

AUTOMATIC CUP PIG LAUNCHING AND RETRIEVING SYSTEM

Jody Littleton, Brighton, and Gary W. Davis, Broomfield, both of Colo., assignors to Tamworth, Inc., Broomfield, Colo.

Filed Dec. 15, 1986, Ser. No. 941,400
Int. Cl.[4] B08B *9/06*
U.S. Cl. 137—268 **18 Claims**

1. Apparatus for launching cup pigs into a pipeline, comprising:

(a) a generally vertically oriented launching barrel of a height sufficient to contain a plurality of cup pigs, said launching barrel having an internal diameter greater than the internal diameter of the pipeline;

(b) an isolation valve connected to said launching barrel and having a flow port of substantially the same internal dimension as said launching barrel;

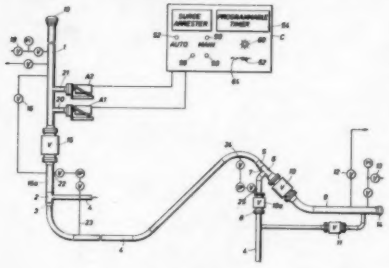
(c) a holding ram located intermediate the upper and lower extremities of said launching barrel and being movable to a pig holding position within said launching barrel and a pig release position permitting downward movement of cup pigs within said launching barrel;

(d) a launching ram located between said holding ram and said isolation valve and being spaced below said launching ram sufficiently that a single cup pig will be received

between said holding ram and launching ram, said launching ram being movable to an extended position blocking downward movement of a cup pig within said launching barrel and a retracted position permitting downward movement of cup pigs;

(e) a pipe section located below said isolation valve and having substantially the same internal dimensions as said launching barrel;

(f) a connection member in the form of a pipe tee coupled in fluid receiving relation with said pipeline and having a straight through passage of substantially the same internal diameter as said pipe section and having a branch connector coupled with said pipeline, said connection member combining a launched cup pig into fluid flowing from said pipeline and permitting fluid pressure induced transport of said cup pig through said pipeline;



(g) a concentric launching reducer having a large end coupled in fluid receiving relation with said connection member and having a small end coupled in fluid supplying relation with said pipeline; and

(h) differential pressure detector means sensing pressure of flowing fluid upstream of said connection member and downstream of said concentric launching reducer and providing a signal indicating passage of a launched cup pig into said pipeline.

4,709,720

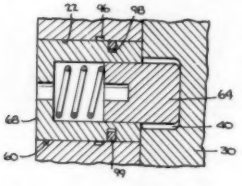
AUTOMATICALLY LOCKING VALVE

Onofrio N. Russo, Middle Village, N.Y., assignor to Gas Energy, Inc., Brooklyn, N.Y.

Filed Oct. 31, 1986, Ser. No. 925,621

Int. Cl.[4] F16K *35/00*

U.S. Cl. 137—385 **3 Claims**



1. A locking valve comprising:

a housing defining a passageway, a stem bore and a lock bore intersecting said stem bore;

a valve stem seated in said stem bore for movement through a range of positions encompassing a closed position in which said valve stem occludes said passageway and an open position in which said valve stem permits fluid flow through said passageway;

said stem being formed with a cylindrical portion confronting said lock bore and with at least one recess in said cylindrical portion;

lock means disposed in said lock bore for automatically arresting movement of said stem upon its movement to one of said positions, said lock means including a sleeve mounted in said lock bore, a pin mounted in said sleeve for axial movement therein and means biasing said pin toward said stem so that a portion of said pin will enter said at least one recess upon movement of said stem to a position in which said recess is aligned with said lock bore;

an annular groove in the surface of said lock bore and a second annular groove formed in the exterior surface of said sleeve, said grooves being out of register when said sleeve is inserted to a desired operable position in said lock bore and being adapted to come into register upon axial movement of said sleeve in a direction away from said stem; and

security means in said groove in said sleeve for limiting said axial movement of said sleeve beyond that position at which said grooves come into registry.

4,709,721

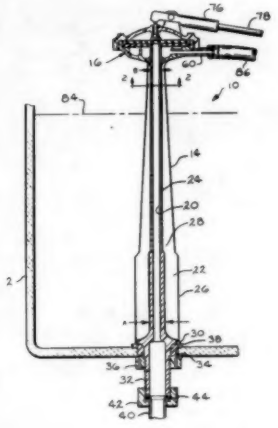
INTEGRAL BASE REFILL SYSTEM BALLCOCK ASSEMBLY

Larry D. Gish, Robards, Ky., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Mar. 18, 1987, Ser. No. 27,542

Int. Cl.[4] F16K *31/20, 33/00, 47/02*

U.S. Cl. 137—437 **4 Claims**



3. A ballcock assembly for controlling the flow of water from a supply line into a toilet reservoir tank comprising:

a ballcock valve assembly including:

a bowl-shaped housing having an outer flange, a central water discharge pipe, vent outlets, an upstanding wall positioned radially between said central discharge pipe and said vent outlets, a bowl fill tube connection communicating with the interior of said housing adjacent said pipe, and a plurality of refill openings encircling said water discharge pipe,

a cover enclosing said housing,

a first flexible diaphragm disposed between said cover and said housing and covering said water discharge pipe, said first diaphragm adapted to control the flow of water from said water discharge pipe,

a second flexible diaphragm disposed between said cover and said housing and having a central hole surrounding said water discharge pipe, said second diaphragm engageable with said upstanding wall,

a ball float lever coupled to said first diaphragm wherein when the water level in said reservoir is below a reference level, water is permitted to deflect said first diaphragm to flow from said discharge pipe and deflects said second diaphragm causing said second diaphragm

to seal against said wall wherein water is discharged through said refill openings and said bowl fill tube connection, and wherein said second diaphragm and said vent outlets operate as a vacuum break when the pressure in said water supply pipe is below atmospheric, said lever acting on said first diaphragm to seal against said water discharge pipe when the water reaches said reference level, and

a standpipe having a central water inlet duct and a plurality of integral generally longitudinally outwardly extending exteral walls, said walls being tapered along the entire length of said standpipe, decreasing in width as they approach the refill openings and terminating on opposite sides of the refill openings, said standpipe adapted to extend vertically within said reservoir tank, said refill openings being oriented such that they produce individual streams of water which are directed along said outside surface of said standpipe and are separated from each other by said walls to maintain the flow of water in contact with the standpipe external walls for producing a cascading flow action to reduce the refilling noise caused by the discharge of the flow of water from the refill openings.

4,709,722

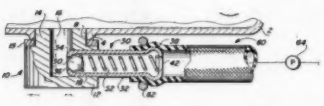
VALVE APPARATUS FOR CRANKCASE OIL DRAINAGE

Paul A. Knapp, 1303 W. 9th St., Tempe, Ariz. 85282

Filed Sep. 22, 1986, Ser. No. 909,876

Int. Cl.[4] F16K *15/04*

U.S. Cl. 137—539 **6 Claims**



1. Drain valve apparatus for draining a fluid from a reservoir, comprising, in combination:

valve body means, including

a valve body securable to a reservoir to be drained,

first bore means in the valve body communicating with the fluid to be drained, and

second bore means in the valve body communicating with the first bore means, and

a threaded portion for securing the valve body to a threaded drain opening of the reservoir to be drained; and

insert means secured to the valve body means and extending into the second bore means and out of the valve body means, including

a tube having a first end for receiving the fluid from the first bore means,

a valve seat in the tube at the first end,

a ball in the tube,

spring means for biasing the ball against the seat, and

connector means extending outwardly from the valve body means for connecting the tube to a conduit for receiving the fluid from the first bore means when the ball is moved off the valve seat.

4,709,723

SEPTIC TANK FOR ALTERNATIVE SEWER SYSTEMS

H. John Sidaway, Findlay, and Donald A. Lytle, Tiffin, both of Ohio, assignors to Hancor, Inc., Findlay, Ohio

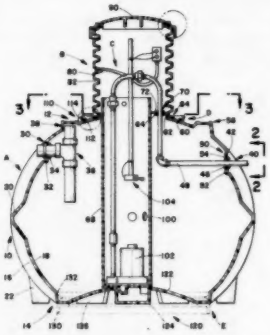
Filed Jul. 17, 1986, Ser. No. 887,077

Int. Cl.[4] F16K *24/00;* **E02D** *29/14*

U.S. Cl. 137—584 **16 Claims**

1. In a corrugated sewage tank which has generally vertically extending alternating ribs and valleys which define a corrugated side wall extending between a bottom wall and an apex area and which ribs and valleys tend to compress in an accordion-like manner and which apex area tends to become distorted under large pressure differentials between the tank interior and exterior, the improvement comprising:

an annular structure mounted to the tank and extending peripherally around the apex area for inhibiting the apex area from becoming distorted under exterior hydrostatic



pressure when the tank is disposed in water-laden soil, the annular structure including a horizontally mounted portion to prevent horizontally inward compression of the apex area and a generally upward standing portion for preventing upward and downward deflection of portions of the apex area out of a plane defined by the annular structure.

4,709,724

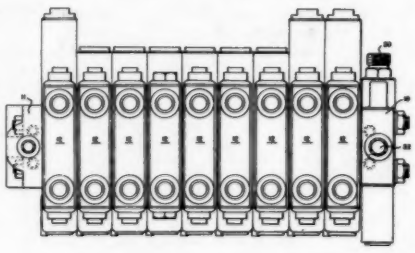
FLUID VALVE STRUCTURES

Arthur Williams, Masury, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio

Filed Jan. 17, 1986, Ser. No. 820,262

Int. Cl.[4] F15B *13/08*

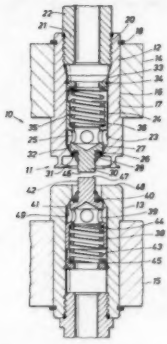
U.S. Cl. 137—596 **47 Claims**



1. A fluid valve structure comprising a first inlet section separately connected to a source of pressure fluid and to a reservoir, a second inlet section, a plurality of side by side valve sections between said first inlet and second inlet sections each having a housing with at least one inlet chamber, a work chamber and a tank chamber intersected by a passage open at opposite ends to a control chamber and a tank chamber at a common pressure, a valve spool having both ends in said chamber at a common pressure and being movable in said passage, said spool having spaced grooves adapted in one position to connect said work chamber to the inlet chamber and in a second position to connect the work chamber with a tank chamber, lever means in said control chamber engaging one end of the valve spool, said lever means being rotatable about a shaft whose axis is transverse to and spaced from the axis of spool valve, seals and bearings in said housing through

which both ends of said shaft pass to the outside of the valve housing, handle means external of the housing acting on the shaft means to rotate the lever means whereby the valve spool moves axially in the passage, said shaft, lever means and valve spool being fully enclosed within the valve housing in all operative positions and a parallel pressure passage provided from the first inlet section to a second inlet section such that pressure fluid is provided at two points in the valve bank to minimize pressure drop to sections remote from the first inlet.

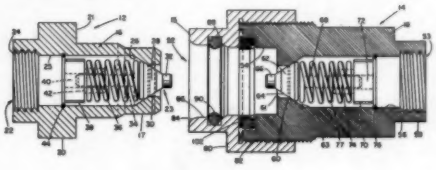
4,709,725
METAL-TO-METAL SEAL STRUCTURE
Bertram L. Morrison, Houston, Tex., assignor to Vetco Gray, Inc., Houston, Tex.
Filed Feb. 17, 1987, Ser. No. 15,071
Int. Cl.[4] F16L *37/28*
U.S. Cl. 137—614.04 **22 Claims**



1. A seal structure for use in preventing fluid leakage from a flow path, comprising: an annular body having a first, inwardly directed flexible flange and a second, outwardly directed flexible flange; a first seal foot on the inner margin of said first flange; and a second seal foot on the outer margin of said second flange, said first seal foot having a lower surface that initially extends below the lower surface of said second seal foot, whereby when said seal structure is brought into engagement with a companion seal surface said first seal foot engages said seal surface first to induce elastic bending of said first flange and rotation of said body prior to engagement of said second seal foot with said seal surface.

12. A connector apparatus for use in a hydraulic system that is employed in remote control of a subsea wellhead or the like, comprising: a first junction plate having at least one valve means thereon for normally closing the end of a hydraulic control line, said valve means having an outlet; a second junction plate having at least one valve means thereon for normally closing the end of another hydraulic control line, said last-mentioned valve means having an inlet; actuator means for automatically opening said valve means to communicate said outlet with said inlet when said junction plates and said valve means are moved relatively toward one another; and a seal structure on one of said valve means engageable with said other valve means when said valve means are open to prevent leakage of hydraulic fluid, said seal structure including an annular body on one of said valve means having an inwardly directed flange and an outwardly directed flange on the outer end thereof, a first, circumferentially continuous seal foot on the inner margin of said inwardly directed flange, a second, circumferentially continuous seal foot on the outer margin of said outwardly directed flange, said first seal foot having a bottom surface that in the relaxed condition of said inwardly directed flange extends beyond the corresponding bottom surface of said second seal foot, whereby when said seal structure is engaged with a companion seal surface on the other of said valve means, said first seal foot engages said seal surface before said corresponding bottom surface engages said seal surface to induce elastic bending of said inwardly directed flange and rotatio of said annular body.

4,709,726
HYDRAULIC COUPLER WITH FLOATING METAL SEAL
Michael R. Fitzgibbons, Houston, Tex., assignor to Ferranti Subsea Systems, Inc., Sugar Land, Tex.
Filed Feb. 17, 1987, Ser. No. 15,797
Int. Cl.[4] F16L *29/00*
U.S. Cl. 137—614.04 **20 Claims**



11. In a hydraulic coupling of a type employing male and female coupling bodies each having a fluid passageway therethrough for the transmission of fluid and including a sealing surface for sealing engagement when the coupling is unmated with a valve means movably mounted within the respective passageway of each coupling body, the female coupling body having a fluid input end and an opposing male receiving end, the valve means within each coupling body having end portions adapted for engagement when the coupling bodies are mated for unseating each valve means from its respective sealing surface for allowing the transmission of fluid through the mated coupling, the improvement comprising:

the male coupling body including a cylindrical outer sealing surface;

a floating ring member housed within the female coupling body and radially movable with respect to the female coupling body;

a first compressible metallic-material seal ring housed on the floating ring member for sealing engagement between the cylindrical outer surface of the male coupling body and a sealing surface on the ring member, the first seal in cross-section having an opening facing the fluid input end of the female coupling body to increase sealing effectiveness of the first seal ring;

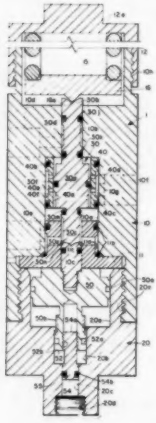
a second compressible metallic-material seal ring housed on the floating ring for sealing engagement between a planar sealing surface of the female coupling body substantially perpendicular to the axis of the coupling and another sealing surface on the ring member, the second seal in cross-section having an opening facing radially outwardly to increase sealing effectiveness of the second seal ring; and

the second metallic seal ring biasing the floating metallic ring out of engagement with the sealing surface of the female coupling body prior to mating of the coupling bodies to facilitate alignment of the male coupling body and the floating metallic ring during the coupling operation, and fluid pressure in the mated coupling biasing the floating metallic ring toward the planar sealing surface of the female coupling body to enhance sealing effectiveness of the second seal ring when the coupling is mated.

4,709,727
PILOT VALVE
Ruel R. Gober, 3525 Lake Catherine, Harvey, La. 70058
Filed Sep. 23, 1986, Ser. No. 910,507
Int. Cl.[4] F15B *13/042*
U.S. Cl. 137—625.66 **23 Claims**

13. A pilot valve comprising a tubular valve body having a

central bore; a radially disposed control fluid inlet port communicating with said central bore; a radially disposed venting port communicating with said central bore at a location axially spaced from said control fluid inlet port; a radially disposed control fluid outlet port communicating with said central bore intermediate said control fluid inlet and outlet ports; a spool valve mounted in said central bore for limited axial movements between a first position and a second position; sealing means between said central bore and said spool valve for directing control fluid from said control fluid inlet port to said control



fluid outlet port and preventing fluid communication with said venting port when said spool valve is in said first position, and connecting said venting port and said control fluid outlet port and preventing fluid communication with said control fluid inlet port when said spool valve shifts to said second position; resilient means urging said spool valve to said first position; piston means responsive to a monitored fluid pressure urging said spool valve to said second position; and means responsive to control fluid pressure in said central bore for biasing said spool valve toward said first position only when displaced therefrom to said second position.

4,709,728

SINGLE-AXIS CONTROL AUTOMATIC FAUCET

Chen Ying-Chung, 841 Chung Shan North Rd., Sec. 5, Taipei, Taiwan

Filed Aug. 6, 1986, Ser. No. 893,724
Int. Cl.[4] F16K *11/18*
U.S. Cl. 137—636.4 **2 Claims**

1. A single axis water faucet for selectively discharging water automatically and manually, said faucet comprising:

(A) a manually actuable valve comprising:

(1) a cylindrical main valve body including:

(i) diametrically opposed hot water and cold water inlets,

(ii) a first water outlet at a first longitudinal end of said main valve body, and

(iii) a side water outlet spaced longitudinally from said first outlet, and

(2) adjusting cylinder means rotatably housed in said main valve body and comprising cylindrical wall means, said adjusting cylinder means including:

(i) a curved adjusting valve plate disposed at one longitudinal end of said adjusting cylinder means in overlying relationship to said hot and cold water inlets and arranged to be rotated along with said adjusting cylinder means to adjust the relative sizes of said hot water and old water inlets,

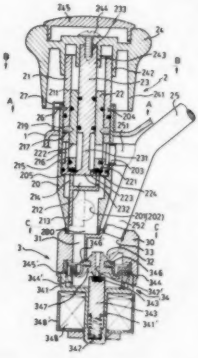
(ii) a hole formed in said cylindrical wall and arranged for alignment with said side water outlet of said main valve body,

(iii) a valve port for communicating said hot and cold water inlets with said hole to discharge water through said side water outlet,

(iv) removable retaining means for rotatably mounting said adjustable cylinder means to said main valve body,

(v) a manually actuable control stem longitudinally slidably disposed in said adjusting cylinder means and including a control rod and a valve plate disposed at one longitudinal end of said valve rod for closing and opening said valve port to control communication between said side water outlet and said cold and hot water inlets in response to longitudinal sliding movement of said valve stem relative to said adjusting cylinder means, and

(vi) a control knob operably connected to said valve stem and said adjusting cylinder means for effecting



longitudinal movement of the former and rotation of the latter,

(3) said adjustable cylinder means, said control stem, and said control knob being removable as a unit from said main valve body in response to removal of said removable fastening means,

(B) an additional water outlet port communicating with said cold and hot water inlets through said first water outlet of said main valve body,

(C) a solenoid valve arranged for opening and closing said additional water outlet port,

(D) infrared sensing means for opening said solenoid valve in response to sensing a user's hand in a predetermined location, to discharge water through said additional water outlet port, and

(E) a water dischasrge pipe including two intake portions communicating with said side water outlet and said additional water outlet port, respectively, and a common discharge outlet commnicating with both said intake portions.

4,709,729

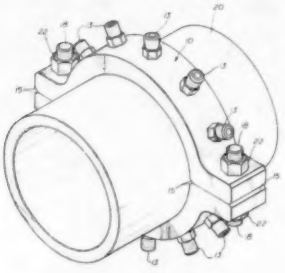
PIPE WELD REPAIR DEVICE AND METHOD FOR THE INSTALLATION THEREOF

George W. Harrison, Houston, Tex., assignor to Team, Inc., Alvin, Tex.

Continuation of Ser. No. 657,192, Oct. 3, 1984, abandoned. This application Jan. 21, 1986, Ser. No. 820,235
Int. Cl.[4] F16L *55/16*
U.S. Cl. 138—99 **10 Claims**

1. A method of forming an assembly, the assembly including: a pipe; at least two pipe clamp segments disposed around said pipe and connected together with connector means to form a

complete clamp; said clamp segment of said clamp segment defining two inner surfaces adapted to be in direct contact with the outer surface of said pipe when said clamp is connected around said pipe; each clamp segment of said clamp segments defining an inner grooved recess disposed between said inner surfaces and adapted to enclose a weld circumferentially disposed around said pipe with said clamp being connected around said pipe; said inner surfaces of said clamp segments defining an internal diameter when said clamp segments are connected to form said complete clamp; said internal diameter being movable around the outside diameter of said pipe while said clamp segments as connected together are at a sufficiently high temperature above the temperature of said pipe to be



thermally expanded; and said internal diameter being reduced to a fixed shrink connection around the outside diameter of said pipe after said clamp segments are allowed to cool from said high temperature to the same temperature of said pipe; the method including the steps of:

(a) heating said clamp segments to a temperature sufficiently above the temperature of said pipe to cause appropriate thermal expansion of said clamp segments;

(b) connecting said clamp segments together while heated to form said clamp disposed around said pipe and covering a circumferential crack in said pipe; and

(c) pausing to allow the temperature of said clamp segments and said pipe to equalize with consequent shrinking of said clamp into a tight shrink connection with said pipe.

4,709,730

PIPE CLUSTER UNIT

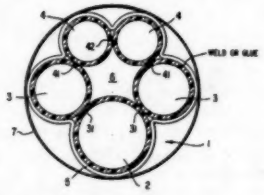
Hermann Zwilling, Rehau, Fed. Rep. of Germany, assignor to Rehau AG & Co., Rehau, Fed. Rep. of Germany

Continuation of Ser. No. 777,361, Sep. 18, 1985, abandoned, which is a division of Ser. No. 587,767, Mar. 9, 1984. This application Dec. 23, 1986, Ser. No. 946,132

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1983, 3308482

Int. Cl.[4] F16L *9/20*

U.S. Cl. 138—111 **7 Claims**



1. A flexible pipe cluster unit comprising

(a) a plurality of synthetic pipes arranged parallel to one another; each pipe being in mutual engagement solely with two adjoining pipes along longitudinal lines of contact to form a pipe cluster; and

(b) a cover layer united by a bond with external surface portions of each of said pipes; said cover layer connecting adjoining pipes to one another by bridging the adjoining pipes at locations spaced from respective lines of contact between adjoining pipes providing bond-free pipe surface portions situated between said respective lines of contact and said cover layer; said surface portions enclosing an empty space; the pipes of the cluster together surrounding an inner space providing a means for allowing a shift of the pipes relative to one another.

4,709,731

FLEXIBLE ELEMENT OF (DUAL) WAVE CREST

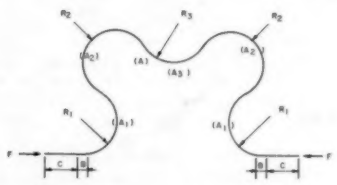
Liang Wang, No.: 49 Defengxixiang, Qianmen, Chongwen Dis., Beijing, China

Filed Mar. 10, 1986, Ser. No. 841,493

Claims priority, application China, Apr. 1, 1985, 85100678

Int. Cl.[4] F16L *11/11, 11/12*

U.S. Cl. 138—121 **5 Claims**



1. A tubular flexible member comprising:

a first cylindrical portion;

a second cylindrical portion; and

an annular flexible segment interconnecting said first and second cylindrical portions, said annular flexible segment comprising,

a first annular arcuate portion connected to said first cylindrical portion and being inwardly arcuate with respect to said first and second cylindrical portions and having a radius of curvature of R1,

a second annular arcuate portion connected to said first annular arcuate portion and being outwardly arcuate with respect to said first and second cylindrical portions and having a radius of curvature of R2,

a third annular arcuate portion connected to said second annular arcuate portion and being inwardly arcuate with respect to said first and second cylindrical portions and having a radius of curvature of R3,

a fourth annular arcuate portion connected to said third annular arcuate portion and being outwardly arcuate with respect to said first and second cylindrical portions and having a radius of curvature of R2; and

a fifth annular arcuate portion connected to said fourth annular arcuate portion and being inwardly arcuate with respect to said first and second cylindrical portions and having a radius of curvature of R1;

said first, second, third, fourth and fifth annular arcuate portions forming an annular flexible segment having a dual wave crest and wherein the radius of curvature R1 is equal to the said radius of curvature R2.

4,709,732

FOURTEEN HARNESS DUAL LAYER WEAVE

Martti I. Kinnunen, Espoo, Finland, assignor to Huyck Corporation, Wake Forest, N.C.

Filed May 13, 1986, Ser. No. 862,761

Int. Cl.[4] D03D *15/00;* **D21F** *1/10*

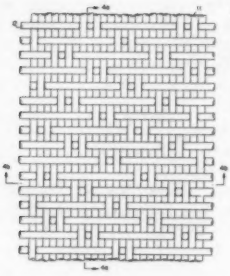
U.S. Cl. 139—383 A **14 Claims**

1. An improved papermakers' fabric comprising a fourteen

harness dual layer endless fabric with at least 80% cover formed of machine direction and cross machine direction yarn systems having:

a set of machine direction yarns;

a first set of cross machine direction yarns located mainly on a side of the fabric facing the material to be formed and interlaced with said set of machine direction yarns in a pattern;



a second set of cross machine direction yarns located mainly on a side of the fabric facing the machine and interlaced with said set of machine direction yarns in a pattern different than the pattern of the first set of cross machine direction yarns;

a float of the interlacing pattern of the machine side cross machine direction yarn being under eleven machine direction yarns; and

each machine direction yarn having the same pattern of interlacing as the adjacent machine direction yarn.

4,709,733

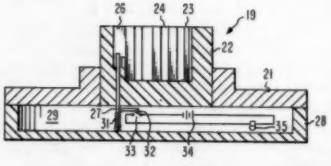
ELECTRON TUBE PIN-SENSING AND STRAIGHTENING DEVICE

Kenneth J. Yakmovitz, Jermyn, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Jul. 24, 1986, Ser. No. 888,804

Int. Cl.[4] B21F *1/02*

U.S. Cl. 140—147 **3 Claims**



1. An electron tube pin sensing and straightening device for use with an electron tube having a plurality of electrical connecting pins and a base for receiving said pins, at least one of said pins being arranged in a silo portion of said base, said pin sensing and straightening device comprising:

a sturdy support member;

an insulative portion affixed to said support member, said insulative portion having an aperture configured to receive said base, and having a silo portion for receiving said silo, whereby said aperture and said insulative portion mate in a particular orientation;

a transparent member affixed to said sturdy support, said transparent member having a cavity juxtaposed said sturdy support;

a slidable pin arranged in said silo portion of said insulative portion, and extending into said cavity, said slidable pin including an actuator arm; said slidable pin being positioned to engage said at least one pin when said sensing and straightening device is mated with said base, and

an indicator circuit arranged in said cavity, said indicator circuit including a battery, a light and a switch positioned for actuation by said actuator arm.

4,709,734

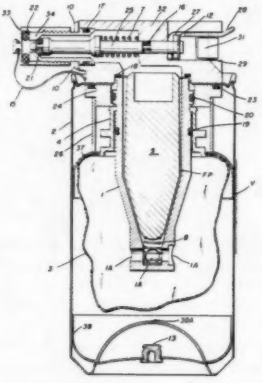
METHOD AND SYSTEM FOR FILLING PACKAGES WITH A CARBONATED BEVERAGE PRE-MIX UNDER MICRO-GRAVITY CONDITIONS

Arthur G. Rudick, Marietta, and William S. Credle, Jr., Stone Mountain, both of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 724,155, Apr. 17, 1985. This application Sep. 18, 1985, Ser. No. 777,316

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—2 **14 Claims**



1. A method for filling packages with a carbonated beverage pre-mix in the micro-gravity conditions of outer space, each package including a rigid container, a collapsible bag disposed within the rigid container, said bag containing the carbonated beverage pre-mix, a drinking spout for dispensing said carbonated beverage directly into the consumer's mouth, a valve associated with said spout for starting or stopping the flow of carbonated beverage therethrough, valve actuator means for opening or closing said valve to start or stop said flow, respectively, propellant gas means disposed in said rigid container around said collapsible bag for compressing said bag and forcing said carbonated pre-mix to flow through said spout when said valve is open, said propellant gas means having a sufficient initial pressure to ensure that the carbonation of said carbonated beverage pre-mix remains in solution throughout the dispensing period of the package, and flow-rate control means for maintaining a substantially constant rate of flow of the carbonated beverage pre-mix from said bag through said drinking spout, comprising the steps of:

(a) providing a supply tank containing a sufficient quantity of carbonated beverage pre-mix to fill a plurality of said packages, said tank including,

1. an outer rigid shell,
2. a collapsible supply bag for containing said quantity of carbonated beverage pre-mix;
3. a dip tube extending into said supply bag having a conduit for accommodating the flow of the pre-mix therethrough;
4. a source of gas under pressure in the rigid outer shell for pressing the walls of the supply bag against the pre-mix, the pressure of said gas being substantially constant and sufficient to maintain the carbonation of the pre-mix in solution, and

5. a valve assembly for coupling the dip tube of the supply tank to the spout of said package; and

(b) connecting the spout of a package to said valve assembly; and

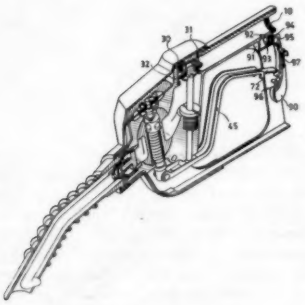
(c) actuating said valve assembly to fill a package with said pre-mix.

4,709,735

AUTOMATIC SHUT-OFF DEVICE FOR FUEL DISPENSER

King-chang Chang, No. 20, Hsi Wei Street, San Chung City, Taiwan

Filed Jan. 3, 1985, Ser. No. 688,525
Int. Cl.[4] B67D 5/04
U.S. Cl. 141—209 **4 Claims**



1. An automatic shut-off dispensing nozzle, especially for dispensing liquid fuel, said nozzle comprising:

(a) a hollow walled handle body, said body defining a chamber, and said body having an inlet, an outlet, and passage means connecting said inlet to said outlet; said passage means being adapted to create a venturi effect when liquid flows through said passage means from said inlet to said outlet in response to activation of a pressurized source of fuel communicating with said inlet; and said passage means providing communication with the atmosphere and said chamber;

(b) a first valve means, said first valve means being arranged at the outlet of said handle body and adapted to allow fuel flow;

(c) a second valve means in said passage means for controlling liquid fuel flow from said inlet to said outlet of said body;

(d) movable control handle means for moving said second valve means to an open position;

(e) means for retaining said control handle means when said second valve means is in an open position, and said retaining means being adapted to release said control handle means when fuel flow is terminated;

(f) at least one diaphragm operatively arranged in said chamber of said hollow walled handle body;

(g) actuating means to release said control handle means resulting in said second valve means being moved to its closed position; said at least one diaphragm being connected to said actuating means in such a way to render said actuating means effective upon movement of said at least one diaphragm in response to a partial vacuum being created in said chamber when the level of the liquid in a respective tank being filled reaches a predetermined level;

(h) a handle guard secured at said handle body;

(i) means for controlling the position of said control handle means when fuel flow from said inlet to said outlet of said body is terminated, a sensing cylinder which is mounted under said passage means at the inlet of said handle body but above said handle guard; and said cylinder including a compression spring;

a sensing piston with an L-shaped piston stem;

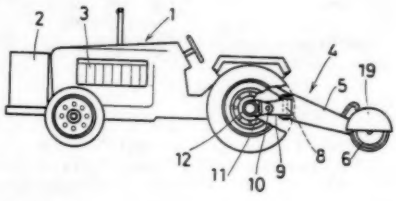
wherein upon the flow of liquid being terminated, the returning force of said compression spring will move said piston stem and said retaining means until said control handle means is separated from said retaining means to automatically terminate fuel flow.

4,709,736

TRACTOR MOUNTED ROTARY CUTTING EQUIPMENT

Terence G. Bellars, P.O. Box 1442 Pietermaritzburg, Natal Province, South Africa

Continuation of Ser. No. 728,305, Apr. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 573,338, Jan. 24, 1984, abandoned. This application Mar. 5, 1986, Ser. No. 837,643
Int. Cl.[4] A01G 23/06
U.S. Cl. 144—2 N **11 Claims**



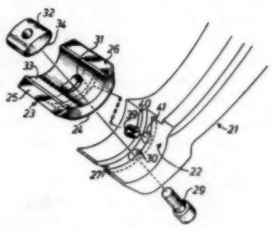
1. Rotary cutting equipment for mounting on a tractor having an engine, a power take off at the rear thereof, and a three point hitch assembly, the rotary cutting equipment comprising a hollow, rearwardly extending rigid beam attached to, and supported by, the tractor's three point hitch through a mounting member at one end of the beam, pivot means for pivotally connecting said beam to the tractor through said mounting member so that both lateral angular slewing of the beam can take place as well as up and down angular movement thereof, means for effecting such angular movements of the beam, a transverse rotatable drive shaft operatively receiving a cutting disc thereon mounted at the other end of the beam, a hydraulic pump operatively connected to the power take off and housed inside said beam, the hollow beam serving as well as a reservoir for hydraulic fluid for the pump, and a hydraulic motor mounted on the beam and powered by said pump, the drive shaft of the cutting disc being coupled directly to the hydraulic motor.

4,709,737

DEBARKING TOOL AND ARM COMBINATION

Karl-Erik A. Jonsson, Floraplan 14, S-802 28 Gävle, Sweden

Filed Sep. 26, 1986, Ser. No. 911,966
Int. Cl.[4] B27L 1/00
U.S. Cl. 144—241 **31 Claims**



1. A debarking device comprising:

a debarking tool and a debarking arm, said debarking arm

being adapted to receive said debarking tool, said debarking tool having a curved bearing surface and said debarking arm being provided with a recessed seat for receiving said debarking tool, said recessed seat having substantially the same radius of curvature as said bearing surface;

guide means provided in the bearing surface of said debarking tool and in said recessed seat of said debarking arm whereby the debarking tool can be located in different positions relative to said recessed seat, and

means for fixing said debarking tool to the recessed seat of said debarking arm,

wherein said guide means comprises a ridge means and a groove means which are provided in the bearing surface of said debarking tool and in the recessed seat of said debarking arm,

wherein the ridge means extends from the peripheral surface of the debarking tool and said groove means comprises at least one groove provided in said curved surface of the recessed seat,

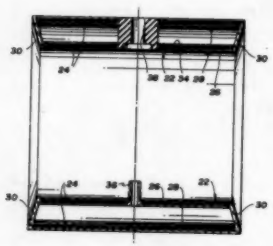
wherein said curved bearing surface and said recessed seat are spherical, and said groove means comprises a plurality of intersecting grooves which radially extend across said recessed surface.

4,709,738

BEAD LOCK FOR PNEUMATIC TIRES

Fred L. Goodell, Grosse Ile, and Michael J. Ellison, Canton, both of Mich., assignors to AM General Corporation, Livonia, Mich.

Filed Feb. 14, 1986, Ser. No. 829,198
Int. Cl.[4] B60C *17/00*
U.S. Cl. 152—400 **4 Claims**



1. A device for locking the bead portions of a pneumatic tire against the outer periphery of a vehicle wheel and being adapted to seat in the vehicle wheel, the device comprising:

at least one endless inextensible band;

an inflatable annular member having radially inner and outer portions and interconnecting side portions, said outer portion comprising a matrix in which said band is embedded; wherein said inflatable member is formed with a cavity extending substantially circumferentially therein and includes a valve through which pneumatic medium is adapted to be supplied into said cavity to inflate said inflatable member; and

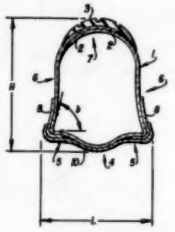
means defining an aperture extending radially completely therethrough said inner and outer portions and said band to communicate the inner and outer portions, said means extending completely between said inner and outer portions within said cavity to prevent communication of pneumatic medium between the cavity and the aperture; said side portions, when said annular member is inflated, preventing the bead portions of the tire from being displaced from the outer periphery of the wheel in the event of a partial or total deflation of the tire and said band preventing radial expansion of said outer portions.

4,709,739

UNIVERSAL TUBULAR-TIRE FOR BICYCLES

Emilio Ruscelli; Cesare Carrera, both of Milan, and Giuseppe Formenti, Motta Visconti, all of Italy, assignors to Pneumatici Clement S.p.A., Italy

Filed Nov. 15, 1985, Ser. No. 798,338
Claims priority, application Italy, Nov. 23, 1984, 23730 A/84
Int. Cl.[4] B60C *5/00, 3/02*
U.S. Cl. 152—453 **9 Claims**



1. In a beadless tubular bicycle tire, having a carcass with at least one rubberized-fabric strip comprising reinforcing cords, the extremities of said strip being jointed so as to form a ring, with its lateral edges jointed together longitudinally to form a closed tubular-carcass of a substantially constant thickness, that presents a tunnel-shaped cross-section comprising a substantially concave supporting-base and two sidewalls terminating in a substantially semicircular vault—with the section-ratio comprised between 1 and 1.7, the inner angle of the corner formed by the coupling between said base and said sidewalls being less than 90°, the improvement wherein corresponding to said base and joined to it, said carcass comprises for each of said coupling-corners a first reinforcing element, said reinforcing element extending on both sides of the corresponding coupling-corner axially on at least part of said supporting base and radially outwardly along the sidewalls of the tubular-tire, for a height of not less than 15% of the section height of said carcass, and a second reinforcing element made of a rubberized-fabric axially extending from one sidewall to the other sidewall of the tubular-tire and reinforced with cords disposed in the circumferential direction with respect to the tire.

4,709,740

DIRECT CHILL CASTING OF ALUMINUM-LITHIUM ALLOYS

John E. Jacoby; Ho Yu, both of Murrysville, and Robert A. Ramser, New Kensington, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

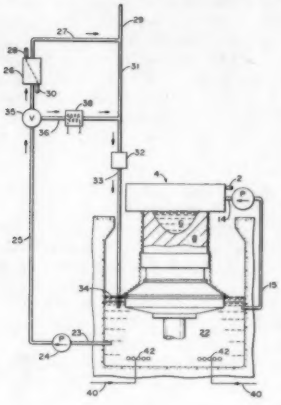
Continuation of Ser. No. 550,466, Nov. 10, 1983, Pat. No. 4,610,295. This application Apr. 11, 1986, Ser. No. 850,488
Int. Cl.[4] B22D *11/24*
U.S. Cl. 164—5 **7 Claims**

1. A method of continuously casting an aluminum-lithium alloy comprising:

cooling aluminum-lithium alloy sufficiently to form a continuous ingot having a substantially solid shell; and

cooling said ingot by direct chill with a coolant comprising ethylene glycol containing water at a controlled level from about 1% to no more than about 5% by volume in a direct chill cooling zone to form a shell of sufficient thick-

ness substantially to avoid bleed-outs and a subsequent lower head transfer for stress relief, said coolant being



applied to the surface of said ingot and separating therefrom.

4,709,741

MOLD MATERIAL AND PROCESS FOR CASTING OF PURE TITANIUM OR TITANIUM ALLOY

Seizo Nakamura, Osaka, Japan, assignor to Ohara Co., Ltd., Osaka, Japan

Filed Dec. 2, 1985, Ser. No. 803,447

Claims priority, application Japan, Dec. 4, 1984, 59-257154; Mar. 22, 1985, 60-58706; Mar. 22, 1985, 60-58705

Int. Cl.[4] B22C *1/00*

U.S. Cl. 164—35 **2 Claims**

1. A process for casting pure titanium or a titanium alloy, which comprises mixing 10 to 80% by weight of silica, 80 to 10% by weight of alumina, 5 to 15% by weight of a phosphate and 5 to 30% by weight of a basic metal oxide together with colloidal silica, hardening the resulting mixture while burying a wax pattern within the mixture to prepare a mold, removing the wax pattern, firing the mold at 900° C. or above to form a refractory structure comprising at least one of mullite, spinel or cordierite in the mold and casting molten pure titanium or titanium alloy in the casting space of the mold.

4,709,742

METHOD FOR PRODUCING A THIN CASTING OF CR-SERIES STAINLESS STEEL

Jiro Harase; Kuniteru Ohta; Tetsurou Takeshita, all of Kitakyushu, and Michio Endo, Kawasaki, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Nov. 24, 1986, Ser. No. 934,108

Claims priority, application Japan, May 24, 1986, 61-118390

Int. Cl.[4] C21D *8/02;* **B22D** *11/00*

U.S. Cl. 164—76.1 **17 Claims**

1. A method for producing a thin casting of Cr-series stainless steel consisting of, by weight %, from 8 to 30% of Cr, from 0.001 to 0.5% of C, from 0.001 to 0.5% of N, and from 0.001 to 0.5% of Al as main components, a balance being essentially iron, a matrix of said Cr-series stainless steel being constituted, on the basis of an equilibrium phase diagram, of an α-phase at an entire temperature region, or of an α-phase at room temperature and α+γ phase at a high temperature region, comprising steps of:

casting a thin casting of said Cr-series stainless steel;

cooling said thin casting from a solidification temperature thereof to an end temperature of a γ-phase-precipitation at a cooling speed at least equal to an air cooling-speed of said thin casting, and,

subsequently subjecting said thin casting to a precipitation treatment in a temperature range of not less than 700° C. and not more than 1000° C. for 10 seconds or more, thereby forming precipitates in the α-phase matrix.

4,709,743

CASTING METAL STRIP

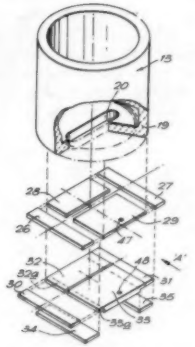
Anthony G. Law, Lichfield, and Michael J. Fleetwood, Bewdley, both of England, assignors to Inco Engineered Products Ltd. and The General Electric Company plc, both of, England

Filed Jan. 15, 1987, Ser. No. 3,625

Claims priority, application United Kingdom, Jan. 28, 1986, 8602001

Int. Cl.[4] B22D *11/06, 11/10, 39/00*

U.S. Cl. 164—463 **17 Claims**



1. Apparatus for dynamic casting of metallic strip or foil wherein a crucible for molten metal to be poured on a moving casting surface has a bottom outlet, an outlet orifice control assembly is mounted to underlie said crucible outlet, said outlet orifice control assembly comprising two opposed shut-off plates mounted for controlled relative movement between closed and open positions to control flow of molten metal from said crucible outlet, and said outlet orifice control assembly further comprising two opposed slot plates underlying said shut-off plates and mounted for controlled relative movement between closed and open positions to define a slot through which the molten metal is discharged onto the moving casting surface.

12. A dynamic casting process for producing thin metallic strip or foil comprising the steps of:

melting a charge in a crucible having a bottom outlet;

providing a moving casting surface;

controlling the flow of molten metal from the bottom outlet onto the moving casting surface by relatively moving two opposed shut-off plates to open a passageway for molten metal; and

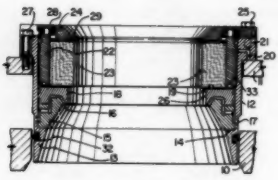
relatively moving two opposed slot plates mounted below the shut-off plates to define an outlet slot.

4,709,744

MODULAR MOULD SYSTEM AND METHOD FOR CONTINUOUS CASTING OF METAL INGOTS

Neil B. Bryson, Kingston; David T. T. Auchterlonie, Jonquiere; Guy LeBlanc, Longueuil, and Vincent J. Newberry, Beaconsfield, all of Canada, assignors to Alcan International Limited, Kingston, Canada

Filed Feb. 27, 1987, Ser. No. 19,649
Claims priority, application Canada, May 27, 1986, 510072
Int. Cl.[4] B22D *11/04, 11/07, 11/124*
U.S. Cl. 164—472 12 Claims



1. A modular mould system for continuous casting of metal ingots comprising:

(a) a hollow cylindrical body adapted to be mounted in a casting table,

(b) an annular water baffle removably mounted in said body, said baffle having a central opening through which a forming ingot passes and said baffle providing a flow path for cooling water to flow radially inwardly from the body and discharge inwardly and downwardly against a forming ingot passing through the central opening,

(c) an annular mould removably mounted in the body immediately above the water baffle and having a central forming cavity for forming a metal ingot, said forming cavity having a smaller diameter than the central opening of the water baffle,

(d) a feed inlet for molten metal comprising an insulating ring removably mounted within the body immediately above the mould, the outer diameter of said insulating ring being less than the diameter of the body,

(e) a pressure ring removably mounted in the body in the annular gap between the body and the outer diameter of the insulating ring, and

(f) a cover plate adapted to compress the components of the mould system together,

wherein at least said annular members may be selectively replaceable with ones of variable inner diameter or length.

11. A method for the production of aluminum ingots by direct chill continuous casting which comprises:

(1) forming a modular mould system comprising (a) a hollow cylindrical body adapted to be mounted in a casting table, (b) an annular water baffle removably mounted in said body, said baffle having a central opening through which a forming ingot passes and said baffle providing a flow path for cooling water to flow radially inwardly from the body and discharge inwardly and downwardly against a forming ingot passing through the central opening, (c) an annular mould removably mounted in the body immediately above the water baffle having a central forming cavity for forming a metal ingot, said forming cavity having a smaller diameter than the central opening of the water baffle, (d) an annular oil plate mounted on top of the mould, (e) a feed inlet for molten metal comprising an insulating ring removably mounted within the body immediately above the mould and resting on the oil plate, the outer diameter of said insulating ring being less than the diameter of the body, (f) a pressure ring removably mounted in the body in the annular gap between the body and the outer diameter of the insulating ring and resting on the oil plate, and (g) a cover plate adapted to compress the components of the mould system together;

(2) pouring molten aluminum into the top of the mould system;

(3) forming a continuous ingot in the mould; and

(4) applying cooling water directly to the surface of the ingot emerging from the mould,

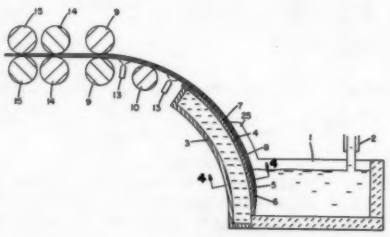
characterized in that the diameter of the ingot to be produced may be changed by changing the annular water baffle, annular mould and oil plate with ones of a different inner diameter.

4,709,745

PROCESS AND APPARATUS FOR MAKING THIN STEEL SLABS

Irving Rossi, Dunross Farm, James St., Morristown, N.J. 07960

Continuation of Ser. No. 718,179, Apr. 1, 1985, abandoned, which is a continuation-in-part of Ser. No. 612,048, May 18, 1984, abandoned. This application Oct. 9, 1986, Ser. No. 916,831
Int. Cl.[4] B22D *11/00, 11/128*
U.S. Cl. 164—484 8 Claims



1. A process for the continuous casting of thin steel slabs of uniform transverse thickness which comprises

exposing a pool of molten metal to a fixed chilled surface which is flat transversely and curved longitudinally to form a convex arc and which has a first portion submerged within the pool and a second portion extending above and beyond the surface of said pool as a continuation of said first portion, said second portion having a length greater than said first portion

withdrawing heat from the molten metal in one direction only through said first portion of said chilled surface while restricting heat transfer from the molten metal along the side edges of said chilled surface to form an embryo flat cast slab thereon which is of uniform thickness across its width, and

withdrawing the embryo cast slab continuously along said chilled surface while continuing to withdraw heat from the embryo flat cast slab in one direction only through said chilled surface while restricting heat transfer from the embryo flat cast slab along the side edges fo said slab, at a rate to permit withdrawal of heat through said chilled surface sufficient to cause a flat slab of the desired thickness to be formed thereon.

4,709,746

PROCESS AND APPARATUS FOR CONTINUOUS SLURRY CASTING

Kenneth P. Young, Ballwin, Mo.; Derek E. Tyler, Cheshire, Conn.; Harvey P. Cheskis, North Haven, Conn., and W. Gary Watson, Cheshire, Conn., assignors to Alumax, Inc., San Mateo, Calif.

Continuation of Ser. No. 627,925, Jul. 5, 1984, abandoned, which is a division of Ser. No. 384,019, Jun. 1, 1982, Pat. No. 4,482,012. This application Apr. 23, 1986, Ser. No. 854,795
Int. Cl.[4] B22D *11/124, 27/02*
U.S. Cl. 164—485 4 Claims

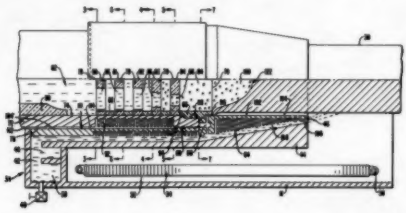
1. A mold for use in a system for casting molten material, said mold comprising:

first chamber means for extracting heat from said molten

material, said first chamber means having means for controlling the amount of heat extracted from the molten material and the cooling rate of the molten material so as to initiate growth of primary phase particles of said material and control solidification to form a semi-solid heterogeneous slurry having a fraction solid comprising said particles sufficient to form a cast structure having a shell and a non-dendritic structure across substantially its entire cross-section, said first chamber means having inner and outer walls formed from a material having the desired thermal conductivity and an exit end;

said controlling means comprising a plurality of spaced apart members lying in at least one circumferential plane, said members being formed from a material having substantially no thermal conductivity wherein the areas between said spaced apart members in each said plane form an effective heat transfer area for removing said heat from said molten material through said walls and wherein said controlling means comprise a plurality of said circumferential planes, each said circumferential plane containing a plurality of said spaced apart members defining said effective heat transfer area, a most upstream one said circumferential planes having the first effective heat transfer area, a most downstream one of said circumferential planes having a second effective heat transfer area wherein said first effective heat transfer area being greater than said second effective heat transfer area;

second chamber means for casting said semi-solid slurry into an ingot having a shell and said cast structure, said second chamber means having an inlet end; and



transition means between the exit end of said first chamber means and the inlet end of said second chamber means for delivering said semi-solid slurry to said casting means and for preventing said shell in said first chamber means from extending into said second chamber means and preventing said shell in said second chamber means from extending back into said first chamber means.

3. A process for casting a molten material, said process comprising:

providing a mold having first chamber means for containing said molten material, second chamber means for casting said material into an ingot and transition means between the exit end of said first chamber means and the inlet end of said second chamber means for delivering said material to said second chamber;

extracting heat from said molten material in said first chamber means;

controlling the amount of said heat extracted from said molten material and the cooling rate of said molten material so as to initiate growth of primary phase particles of said molten material and control solidification to form a semi-solid heterogeneous slurry within said first chamber means, said slurry having a fraction solid comprising said particles sufficient to form a cast structure having a shell and a non-dendritic structure across substantially its entire cross-section;

delivering said slurry to said second chamber means;

solidifying said semi-solid slurry within said second chamber means into said ingot having said cast structure and a shell; said transition means preventing any of said shell formed in said first chamber means from extending into said second chamber means and preventing said shell in said second chamber means from extending back into said first chamber means;

providing a plurality of circumferential planes containing at least member formed of a material having a relatively low thermal conductivity, each said circumferential plane having its effective heat transfer area defined by that portion of said plane non-encompassing said at least one member;

providing a most upstream one of said circumferential planes with a first effective heat transfer area;

providing a most downstream one of said circumferential planes with a second effective heat transfer area less than said first effective heat transfer area; and

extracting said heat from said molten material through said heat transfer areas.

4,709,747

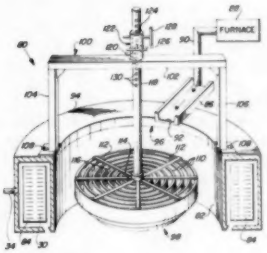
PROCESS AND APPARATUS FOR REDUCING MACROSEGREGATION ADJACENT TO A LONGITUDINAL CENTERLINE OF A SOLIDIFIED BODY

Ho Yu, and Douglas A. Granger, both of Murrysville, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 774,887, Sep. 11, 1985, abandoned. This application Aug. 22, 1986, Ser. No. 899,492

Int. Cl.[4] B22D *11/00*

U.S. Cl. 164—487 **23 Claims**



1. A process for reducing macrosegregation adjacent to a centerline of a solidified body, said body being formed from a pool of molten metal having flow currents present therein, said liquid pool having dendrites which are lean in eutectic elements growing about the periphery thereof as said molten metal solidifies, said process comprising the step of weakening the magnitude of said flow currents by placing a mechanical damper in said pool, said damper including at least three plates connected together to form at least two passageways therebetween through which said molten metal can flow, said damper reducing shear stress acting on the tips of said dendrites and thereby reducing breakage and transport of particles of said dendrites to the center of said solidified body.

11. An apparatus for reducing macrosegregation in a solidified body formed in a mold from a liquid pool of molten metal having flow currents present therein, said apparatus comprising:

(a) a support structure positioned above said mold;

(b) a damper including at least three plates with a passageway formed between adjacent plates through which said molten can flow; and

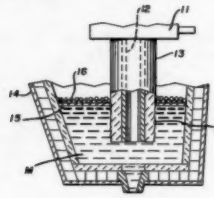
(c) attachment means for securing said damper to said support structure whereby said damper is positioned within said liquid pool at a desired depth to weaken said flow currents.

4,709,748

PROTECTIVE SLEEVE FOR THE SHROUD OF A HOT METAL LADLE

Micheal D. Labate, 115 Hazen Ave., Ellwood City, Pa. 16117

Filed Nov. 4, 1986, Ser. No. 926,680
Int. Cl.[4] B22D *11/10, 1/00*
U.S. Cl. 164—488 **4 Claims**



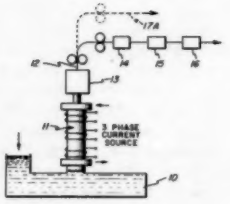
3. A method of delivering and cleaning molten steel from a ladle to a mold which includes the steps of flowing the molten steel through a shroud communicating with said ladle into a receptacle communicating with said mold, insulating said shroud with a protective sleeve thereon, immersing a portion of said shroud and sleeve in said molten steel with slag thereon in said receptacle to protect said molten steel in said receptacle around said shroud and sleeve from atmospheric air, neutralizing acid in said slag with a reactive agent in said sleeve, protecting said molten steel in said receptacle with a sealing covering compound, and substantially maintaining the temperature of said molten steel in said shroud with said protective sleeve.

4,709,749

CONTINUOUS METAL CASTING APPARATUS

Hugh R. Lowry, Fairfield, Conn., and Robert T. Frost, Berwyn, Pa., assignors to General Electric Company, Bridgeport, Conn.

Continuation of Ser. No. 430,830, Sep. 30, 1982, which is a continuation of Ser. No. 165,421, Jul. 2, 1980, abandoned. This application Dec. 15, 1986, Ser. No. 941,997
The portion of the term of this patent subsequent to Nov. 8, 2000, has been disclaimed.
Int. Cl.[4] B22D *27/02*
U.S. Cl. 164—503 **13 Claims**



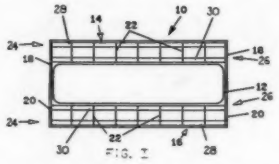
1. Continuous casting apparatus comprising an elongated casting vessel disposed in upright position to receive liquid metal for solidification, means for delivering liquid metal into a lower portion of the vessel, heat exchange means associated with the casting vessel for cooling and solidifying liquid metal therein, electromagnetic levitation and containment field producing means disposed around the casting vessel along a portion of its length for simultaneously reducing the hydrostatic head of the liquid metal to a minimum and maintaining a predetermined dimensional relationship between the outer surface of the liquid metal and the interior surrounding surfaces of the casting vessel, excitation current supply means coupled to said electromagnetic levitation and containment field producing means for establishing and maintaining the electromagnetic levitation and containment field, means for controlling excitation current supplied to said electromagnetic field producing means for maintaining the value of the containment electromagnetic field so that the cross section of the liquid metal is less than the cross sectional area of the interior surrounding surface of the casting vessel to establish a slight gap but is sufficiently large to preclude formation of a substantial gap between the outer surface of the liquid metal and the interior surrounding surfaces of the casting vessel to thereby effect heat transfer between the liquid metal and the casting vessel sufficient to solidify the liquid metal while simultaneously reducing gravitational, frictional and adhesive forces acting on the liquid metal to a minimum, means independent from said electromagnetic levitation field producing means for moving the liquid metal upwardly into the casting vessel and within the electromagnetic field, and means for removing solidified metal product from the upper portion of the vessel.

4,709,750

PHASE CHANGE HEAT EXCHANGER

Geoffrey T. White, Omaha, Nebr., assignor to InterNorth, Inc., Omaha, Nebr.

Filed Apr. 10, 1986, Ser. No. 850,027
Int. Cl.[4] F28D *17/00*
U.S. Cl. 165—10 **2 Claims**



1. A phase change heat exchange unit which comprises:
(a) upper and lower skeletal support frames having
(i) opposing side walls wherein the upper frame is supported on the lower frame at oppositely facing edges of the side walls,
(ii) at least two spaced apart grid supports forming an air passage therebetween and extending between the side walls remote from said oppositely facing side wall edges, said grid supports formed by a plurality of cross support beams extending between the side walls and a plurality of vertical spacers extending parallel to the side walls and intersecting and supporting said cross support beams, and
(iii) means for securing the upper and lower frames together, and
(b) a container filled with a phase change material disposed between the upper and lower frames and supported thereby.

4,709,751

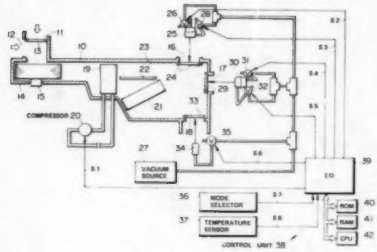
VEHICULAR AIR CONDITIONER WITH DEFOGGING FEATURE

Yoshiro Ichimaru, Yokohama; Shigeru Kobayashi, Zama, and Toshio Ohashi, Atsugi, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Aug. 16, 1985, Ser. No. 766,192
Claims priority, application Japan, Aug. 20, 1984, 59-171483
Int. Cl.[4] F25B *29/00;* **B60S** *1/54;* **B60H** *3/00*
U.S. Cl. 165—17 **3 Claims**

1. An air conditioner for a vehicle having a window, the air conditioner comprising:
(a) first means for conditioning air, said first means including an air duct having a defroster outlet, a vent outlet and a floor outlet, and an evaporator, a heater, and an air mixing door located within the air duct;

(b) second means for moving air to be conditioned through the first means;
(c) third means, connected to the first means for directing the conditioned air toward the window via the defroster outlet to prevent the window from fogging over;
(d) fourth means, connected to the first means for directing the conditioned air toward an upper part of a vehicle passenger compartment via the vent outlet;
(e) fifth means, connected to the first means for directing the conditioned air toward a lower part of the vehicle passenger compartment;

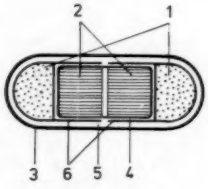


(f) sixth means for setting a preset bi-level operation mode;
(g) a cooling compressor connected to the evaporator of the first means; and
(h) control means for selectively activating and deactivating the compressor and for controlling the third, fourth and fifth means, when a preset bi-level operation mode has been set by the sixth means, to block the defroster outlet, unblock the vent outlet and the floor outlet when the compressor is activated, and to unblock the defroster outlet, the vent outlet and the floor outlet when the compressor is deactivated.

4,709,752
COOLING ARRANGEMENT FOR HEAT GENERATING ELECTRICAL COMPONENTS

Johann Schröder; Klaus Gawron, both of Aachen; Leo Bertram, Stolberg, all of Fed. Rep. of Germany, and Hugo Schemmann, Schaesberg, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 27, 1986, Ser. No. 879,728
Claims priority, application Fed. Rep. of Germany, Jul. 6, 1985, 3524242
Int. Cl.[4] H02K *9/00*
U.S. Cl. 165—47 **9 Claims**

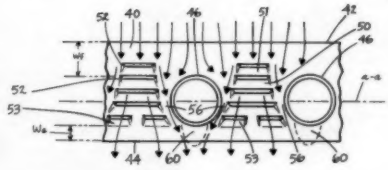


1. A cooling arrangement for heat generating electrical components comprising:
a latent heat store between the heat generating component and a component to be protected from overheating, the latent heat store comprising a latent heat storing agent whose melting-point T is between the operating temperature of the heat generating component and the maximum permissible temperature of the component to be protected, the quantity of said storing agent is proportioned so that the storage capacity of the latent heat store is sufficient for the amount of maximum heat generated by the heat generating component, between the heat transmitting component and the latent heat store and between the latent heat store and the component to be protected, a thermal insulation is provided, and the melting-point T of the latent heat storing agent and the thicknesses d of the respective insulations between said heat transmitting component and store, and store and component to be protected are proportioned so that the temperature gradient $\Delta T/d$ from the heat generating component, which is at the operating temperature, to the latent heat store is greater than the temperature gradient $\Delta T/d$ from the latent heat store to the component to be protected.

4,709,753
UNI-DIRECTIONAL FIN-AND-TUBE HEAT EXCHANGER

Allan J. Reifel, Florissant, Mo., assignor to Nordyne, Inc., St. Louis, Mo.

Filed Sep. 8, 1986, Ser. No. 904,406
Int. Cl.[4] F24B *1/06*
U.S. Cl. 165—125 **10 Claims**



1. For exchanging heat between liquid and air, a uni-directional fin-and-tube heat exchanger having a curved portion and being of the type in which air flows in from the outside of the curve, comprising
a single row of linearly-aligned ductile tubes of circular cross-section for conducting such liquid, in combination with
a plurality of fins formed from originally planar ribbon-like fin stock and having parallel leading and trailing edges between which air flows generally aft, further having
circular collars spacedly between edges drawn from the original plane of said fin stock, whereby to accept said tubes perpendicular to the fins,
there being, in each fin stock area defined by the spacing of the tube centers from each other, a plurality of longitudinal louvers bent from the plane of said fin stock toward one side only thereof, and open adjacent to the leading edge, whose length increases progressively between said edges from a length substantially less than the distance of the nearest collar walls from each other, to a length at least substantially equal to the such distance, each louver being supported by louver end walls formed from such plane and spaced from said collars,
whereby a greater portion of the air inflowing along the leading edge at each side of a collar is channeled convergingly by the louver end walls into otherwise stagnant air spaces along the fin stock behind the collars,
the said collars being offset aft of a centerline between the leading and trailing edges and inward of the trailing edge of said fin stock, whereby to decrease their distance from the trailing edges of the fins,
such heat exchanger curved portion being formed by said tubes being bent to such an arc, common to all said tubes, that the trailing edges of said fins are inside the curve of the arc,
whereby the decreased distance from the collars to the fin trailing edges increases the spacing of adjacent trailing edges from each other, thereby lessening the resistance to

airflow from angular convergence of the fins, and the extent of such otherwise stagnant air spaces along the fin stock behind the collars may be somewhat lessened.

4,709,754

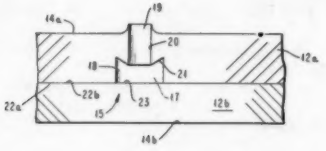
HEAT TRANSFER ELEMENT WITH NUCLEATE BOILING SURFACE AND BIMETALLIC FIN FORMED FROM ELEMENT

Richard C. Chu, and Robert E. Simons, both of Poughkeepsie, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 756,219, Jul. 18, 1985, abandoned. This application Oct. 24, 1986, Ser. No. 921,902

Int. Cl.[4] F28F 3/06

U.S. Cl. 165—133 **6 Claims**



5. A heat transfer element containing nucleate boiling cavities providing the heat transfer element with a nucleate boiling surface for heat transfer to a liquid in contact with the surface, comprising:

a metal foil, the surfaces of the foil being designated "outer" and "inner", the foil having a plurality of through holes formed as a larger diameter hole opening to the inner surface and forming a main cavity in the heat transfer element and a smaller diameter hole opening to the outer surface and forming the entrance of the nucleate boiling cavity in the heat transfer element,

the foil in the region of the intersection of the main cavity and the entrance being designated the ceiling of the cavity, said ceiling having a truncated cone shape inverted to reduce flooding to the main cavity by said liquid,

a substrate of thermally conductive material, the foil being attached at its inner surface to the substrate whereby the surface of the substrate closes the holes opening to the inner surface and thereby forms the floor of the nucleate boiling cavities.

4,709,755

HEAT EXCHANGER

Cecil C. Gentry, and William M. Small, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 692,449, Jan. 16, 1985, Pat. No. 4,633,940, which is a division of Ser. No. 477,475, Mar. 21, 1983, abandoned, which is a division of Ser. No. 182,741, Aug. 29, 1980, Pat. No. 4,429,739. This application Sep. 3, 1986, Ser. No. 903,355

Int. Cl.[4] F28F 9/22

U.S. Cl. 165—160 **9 Claims**

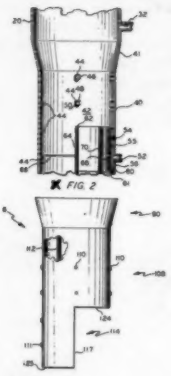
1. Apparatus comprising:

(a) a shell having a generally cylindrical interior surface;

(b) at least one channel affixed to the generally cylindrical interior surface of the shell, said channel having a generally circumferential path portion and a generally longitudinal path portion with respect to the generally cylindrical interior surface of the shell, the circumferential path portion having a mouth at one end and opening into the longitudinal path portion at the other end, the longitudinal path portion being at least partially closed at each of its ends and having at least one end removed from the opening from the circumferential path portion;

(c) a shroud having a generally cylindrical exterior surface in juxtaposed relationship with the generally cylindrical interior surface of the shell;

(d) at least one boss extending radially outward from the generally cylindrical exterior surface of the shroud suitable for being received by the at least one channel on the generally cylindrical interior surface of the shell at a position in the channel adjacent the end of the longitudinal path portion which is spaced apart from the opening from the circumferential path portion.



4,709,756

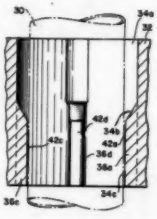
STEAM GENERATOR TUBE SUPPORT

Robert M. Wilson, Plum Boro, and Robert M. Wepfer, Wilkinsburg, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 13, 1984, Ser. No. 670,773

Int. Cl.[4] F28F 9/00

U.S. Cl. 165—162 **5 Claims**



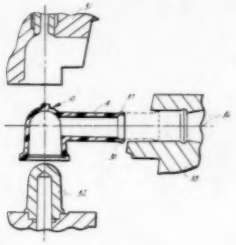
1. A tube support plate for supporting a plurality of tubes with reduced vibration in a nuclear steam generator, said support plate being of a solid construction and having a plurality of holes disposed therethrough in a regular array, each of said holes having an axis, an interior surface and a plurality of lands supported on said interior surface, said support plate having a given thickness as taken along said axis, each of said lands is disposed substantially parallel with and extends towards its hole axis, whereby a drop in the fluid flow rate through said holes is minimized each of said lands has at its exposed end a contact surface disposed toward said axis for supporting one of the tubes and a height taken along said axis less than said given thickness.

4,709,757

METHOD OF INJECTION MOLDING AND PLASTIC PART FORMED THEREBY

Tom C. Bly, Erie, Pa., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Nov. 24, 1986, Ser. No. 934,437
Int. Cl.[4] F28F *9/00*; B29C *45/44*
U.S. Cl. 165—173 4 Claims



3. A plastic molded radiator part having a tubular portion for supporting a hose, said tubular portion being provided with a smooth external surface uninterrupted with any sharp protrusions that could extend into a hose on said tubular portion and having a radially enlarged external surface lip at the terminal end thereof and a reduced thickness wall portion at the terminal end.

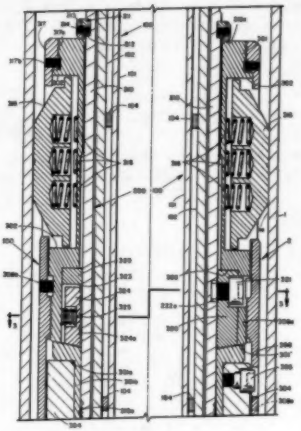
4,709,758

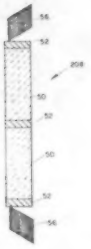
HIGH TEMPERATURE PACKER FOR WELL CONDUITS

Dan C. Preston, Jr., Whittier, Calif., assignor to Baker Oil Tools, Inc., Orange, Calif.

Filed Dec. 6, 1985, Ser. No. 806,030
Int. Cl.[4] E21B *33/128, 33/129*
U.S. Cl. 166—120 4 Claims

1. A packer for a subterranean well having a casing comprising, in combination, an inner tubular body assembly having connector means at its upper end for detachable threaded connection to the bottom of a tubing string whereby the packer may be run into the casing to a desired position; a outer operative tubing assembly mounted in surrounding relationship to a medial portion of said inner tubular bod*y* assembly; said outer tubular body assembly including a drag block unit, a connection block, a slip mechanism including peripherially spaced slips and upper and lower cone elements, an external packing element having one end abutting said lower cone element and deformable by axial force to sealing engage the bore of the casing, and an annular abutment element engaging the other end of said packing element; a J-pin radially transversing said connecting block, a J-slot in said inner tubular body assembly receiving said J-pin for securing said inner tubular body assembly and said outer tubular operative assembly in a fixed relationship during run-in of the packer in the casing with only said drag block unit engaging the casing wall; said J-pin and J-slot bewing operable by limited rotation of said inner tubular body assembly relative to said outer tubular operative assembly to release said assemblies for limited relative axial movememnt; collet means for detachably securing said inner tubular body assembly to said abutment element, whereby upward movement of said inner tubular body assembly produced solely by upward movement of the tubing string applies an axial force to said packing element and moves said lower cone element toward said upper cone element to expand said slips into biting engagement with the casing bore; axially extending ratchet teeth formed on the periphery of said inner tubular assembly; and a segment shaped detent unit radially shiftably mounted in said connecting block and having a serrated inner surface engagable with said ratchet teeth to prevent downward movement of said inner tubular body assembly





relative to said outer tubular assembly, thereby locking the axial compressive force in said external packing element.

4,709,759

ENHANCED OIL RECOVERY WITH HYDROPHOBICALLY ASSOCIATING POLYMERS CONTAINING N-VINYL-PYRROLIDONE FUNCTIONALITY

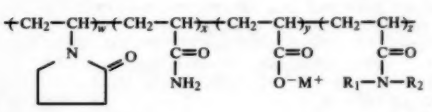
Jan Bock, Bridgewater; Salvatore J. Pace, Glen Gardner, and Donald N. Schulz, Annandale, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 29, 1986, Ser. No. 946,864
Int. Cl.[4] C08F *20/06*; E21B *43/22*
U.S. Cl. 166—275 10 Claims

1. A water flooding process for the secondary recovery of oil from a production well comprising injecting an aqueous solution under pressure to force oil to the production well, said aqueous solution comprising:

(a) water; and

(b) about 100 to about 5,000 ppms of a water soluble polymer having the formula:



wherein R_1 is a C_6 to C_{22} straight chained or branched alkyl or alkylcycloalkyl group; R_2 is hydrogen or a C_6 to

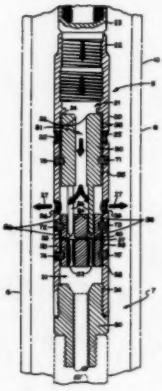
C_{22} straight chained or branched alkyl or ycloalkyl group or a C_1 to C_3 straight chained or branched alkyl group; and M^+ is an alkali metal or ammonium cation, wherein x is about 10 to 90 mole percent, y is about 2 to about 40 mole percent, z is about 0.1 to about 10.0 mole percent, and w is about 1 to about 80 mole %.

4,709,760

CEMENTING TOOL

Wilmer W. Crist, 110 Teche Dr., and Dan Firmin, 215 Camelia Blvd., both of Lafayette, La. 70503

Filed Oct. 23, 1981, Ser. No. 314,356
Int. Cl.[4] E21B *43/11, 33/13*
U.S. Cl. 166—285 **24 Claims**



1. An apparatus for cementing an oil or gas well casing comprising:

a. a tubular body section for placing in an oil or gas well casing, said tubular body section being connectable at its upper end to a string of drill pipe and at its lower end to means for perforating an oil or gas well casing, said tubular body section having;

(i) a hollow interior;

(ii) a plurality of upper port means;

(iii) a plurality of lower port means;

b. a sliding sleeve means having firing pin means connected thereto, said sliding sleeve means being located inside said tubular body section, said sliding sleeve means being adapted to permit drilling fluids to be pumped therethrough and out of said lower ports and to slide downwardly in response to pressure applied to the interior of said string of drill pipe when seal means are placed in contact with said sliding sleeve means and thereby

(i) activate said means for perforating an oil or gas well casing to perforate said casing,

(ii) close said lower ports, and

(iii) open said upper ports to permit cement or other fluids to be pumped outwardly through said upper ports.

4,709,761

WELL CONDUIT JOINT SEALING SYSTEM

John R. Setterberg, Jr., Victoria, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Division of Ser. No. 626,442, Jun. 29, 1984, Pat. No. 4,602,796. This application May 27, 1986, Ser. No. 867,015
Int. Cl.[4] E21B *29/00*; B23B *41/12*
U.S. Cl. 166—387 **16 Claims**

2. A milling tool for forming an upwardly facing sealing surface on a shoulder in a conduit comprising:

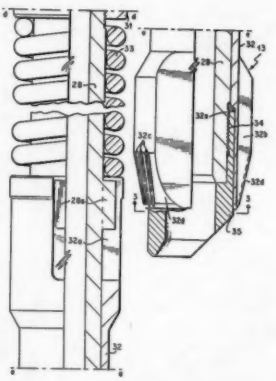
(a) an upper mandrel having a top connector;

(b) an intermediate mandrel connected to said upper mandrel;

(c) a lower mandrel connected to said intermediate mandrel having

a cutter slidably mounted thereon,

adjustable biasing means for controlling downward force on said cutter including



an adjusting ring threaded on said lower mandrel and

a spring around said lower mandrel between said ring and said cutter, and

a shoulder limiting downward travel of said cutter; and

(d) means for keying said lower mandrel to said cutter.

4,709,762

VARIABLE FLUID PASSAGEWAY FOR A WELL TOOL

Ronald E. Pringle, Houston, Tex., assignor to Camco, Incorporated, Houston, Tex.

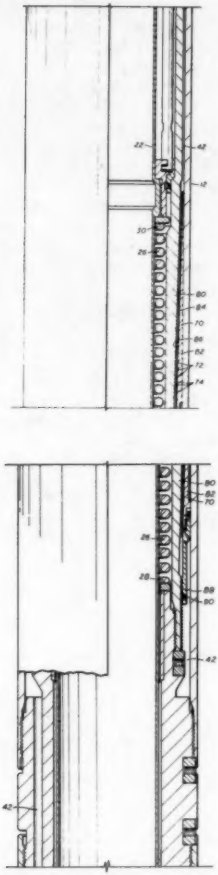
Continuation-in-part of Ser. No. 789,234, Oct. 18, 1985, Pat. No. 4,629,002. This application Dec. 15, 1986, Ser. No. 941,973
Int. Cl.[4] E21B *34/10*
U.S. Cl. 166—324 **10 Claims**

1. In a well tool having a housing and a pressure reducing and fluid velocity reducing passageway, the improvement comprising,

said passageway formed by first and second vertically positioned members spaced from each other,

said first member having a tapered surface including a plurality of grooves and ridges,

said second member having a tapered surface facing the grooves and ridges, and



means for longitudinally moving one of the members relative to the other member for adjusting the space between the members thereby adjusting the size of the passageway.

4,709,763

SELF-ACTIVATING FIRE EXTINGUISHER

James Jessick, Franklin Township, Gloucester County, N.J., assignor to Future Fire Suppression, Inc., Franklinville, N.J.

Filed Feb. 13, 1987, Ser. No. 14,720

Int. Cl.[4] A62C *35/02*

U.S. Cl. 169—26 **10 Claims**

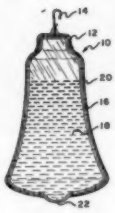
1. A self-activating fire extinguisher comprising:

a glass container having an outer surface, said container being totally closed and sealed from the outside atmosphere;

a quantity of a fire extinguishing liquid within said container, said liquid having a relatively low boiling point and, when converted into a gaseous state, having fumes which are denser than air whereby said fumes tend to settle downwardly and are capable of extinguishing a fire;

a thin but substantially flexible plastic material coating substantially the entire outer surface of said glass container and adhering thereto, said plastic coating being capable of substantially maintaining its shape and physical characteristics and of adhering to said glass container at a temperature above the boiling point of said liquid and above the temperature which is needed for the boiling liquid in said container to cause said container to shatter;

at least one portion of the outer surface of said glass container being devoid of said plastic coating;



whereby, in the event of a fire, the temperature of the liquid within said container rises and the same begins to boil thereby increasing the pressure within the container until at least a portion of the glass shatters, said plastic coating substantially maintaining the shape of said container so that said liquid and the fumes therefrom escape substantially only at that portion of the glass container which is not coated by said plastic.

4,709,764

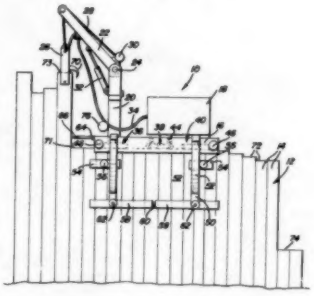
SHEET PILE SUPPORTED DRIVER

Frank B. Gibbons, Mesa, Ariz., assignor to Maxine S. Gibbons, Pataskala, Ohio

Filed Jan. 16, 1986, Ser. No. 819,344

Int. Cl.[4] E21B *15/04*

U.S. Cl. 173—45 **7 Claims**



1. A driver for sheet piles adapted to be supported from the upper edge of a wall formed by a plurality of sheet piles comprising a frame, boom means on the frame, a sheet pile hammer supported from said boom means, a plurality of longitudinally extending and longitudinally spaced roller and track assemblies on the frame and adapted to be in supporting engagement with the top edge of a sheet pile wall to enable the frame to move in both directions along the top edge of the sheet pile wall, and means on the frame and depending therefrom in laterally spaced relation for engaging opposite surfaces of the sheet pile wall below the top edge thereof for stabilizing the frame on the top edge of the sheet pile wall, said means on the frame and depending therefrom including a pair of laterally spaced depending support members rigid with the frame, each of said support members including a pair of vertically spaced guide shoes thereon for engaging the surface of a sheet pile wall, and means interconnecting the support members and guide shoes for providing clamping force on the guide shoes for biasing the guide shoes into clamping engagement with the opposite sur-

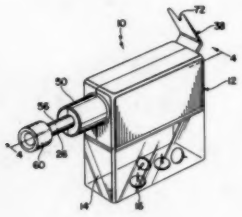
faces of the sheet pile wall, said means interconnecting the depending support members and guide shoes including a hydraulic piston and cylinder assembly and a spring device associated with each guide shoe and extending from a support member for exerting clamping pressure on the guide shoes with the clamping pressure being variable by operating the piston and cylinder assembly and being maintained in the event of hydraulic pressure failure by the spring means, the lowermost guide shoes on each of the depending support members being horizontally elongated and disposed in horizontal alignment and generally perpendicular to the support members with the inner ends being disposed in adjacent relation and means hingedly interconnecting the adjacent ends of the horizontally elongated shoes to enable movement of the guide shoes and frame along the top edge of a curved sheet pile wall, each of said roller and track assemblies having a width substantially greater than the width of the sheet pile wall with manipulation of the guide shoes enabling the roller and track assemblies and frame to be centered and laterally adjusted in relation to the wall, said frame having three roller and track assemblies thereon with the centermost roller and track assembly being vertically adjustably connected to the frame for vertical movement to enable the frame to move along uneven upper edge portions of the sheet pile wall, means reversibly driving the endmost roller and track assemblies for moving the driver along the top edge of the wall, at least one end of the frame being provided with a sheet pile clamp connected to a piston and cylinder assembly extending longitudinally therefrom and connected to the frame to enable the frame to be pushed or pulled along the top edge of the wall.

4,709,765

TACK DRIVER

Ronald J. Campanell, 86A Touisett Rd., Warren, R.I. 02885

Filed Mar. 28, 1986, Ser. No. 846,289
Int. Cl.[4] B23B *45/16*
U.S. Cl. 173—119 **5 Claims**



1. A device for driving tacks and the like comprising:

(a) a housing,

(b) a plunger having inner and outer ends and slidably mounted in said housing so that it projects outwardly therefrom terminating in said outer end, said plunger being slidable in said housing between an outwardly extended first position and a retracted second position;

(c) a hammer element mounted in said housing and having a bore therein which terminates in a bore inner end, the inner end portion of said plunger being slidably receivable in said bore, said hammer element being mounted so that it is movable to a position wherein said bore inner end is in engagement with the inner end of said plunger;

(d) means biasing said hammer element so that said bore inner end is biased toward said plunger inner end;

(e) a release pin mounted in said hammer element, said release pin being of substantialy circular cross section and of elongated configuration, said release pin having an enlarged retainer portion and a reduced release portion, said release portion defining a rounded annular groove in said release pin, said retainer portion engaging said plunger inner end when said plunger is in the first position thereof, said release pin being mounted so that it is slidable between a position wherein said retainer portion engages said plunger inner end to maintain the latter in spaced relation to said bore inner end and a position wherein said reduced release portion is positioned adjacent said bore to enable said plunger inner end to pass by said release pin and to be engaged by said bore inner end when said plunger is in the second position thereof; and

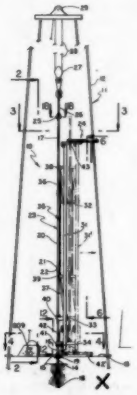
(f) means positioning said release pin so that it engages the inner end of said plunger when said plunger is in the first position thereof and also as said plunger is moved from the first position thereof toward the second position thereof but so that said plunger inner end can pass by said release pin when said plunger is in the second position thereof, whereby as said plunger is moved inwardly in said housing, said hammer element is urged against said biasing means to effect a loading thereof, but when said plunger reaches said second position thereof, said hammer element is propelled into impacting enagement with said plunger inner end to drive a tack positioned in engagment with said plunger outer end.

4,709,766

WELL PIPE HANDLING MACHINE

George I. Boyadjieff, Anaheim, Calif., assignor to Varco International, Inc., Orange, Calif.

Filed Apr. 26, 1985, Ser. No. 727,724
Int. Cl.[4] E21B *19/14*
U.S. Cl. 175—52 **41 Claims**



17. A well pipe handling machine for use in a rig having a string of pipe extending vertically along an axis of a well and having a rack for receiving and holding a series of pipe sections from said string in essentially vertically extending condition, comprising:

a support column structure which extends essentially vertically and is movable generally horizontally to store said sections of pipe in said rack or retrieve them therefrom;

pipe holding means carried by said support column structure for movement therewith and adapted to hold a section of pipe in vertical condition during such movement;

means for moving said support column structure and said pipe holding means carried thereby and a vertical pipe section supported by said pipe holding means between a first position in which the support column structure extends essentially vertically and said pipe holding means support said pipe section in vertical condition in alignment with said axis of the well and a second position in which said column structure remains in essentially vertically extending condition but is offset horizontally from said first position and in which said pipe holding means can

move a pipe supported thereby in vertical condition into or out of said rack; and

a control station for carrying an operator and having controls for operating the machine, and which control station is mounted to said support column structure for movement therewith and with said pipe holding means and with a vertical pipe held thereby between said first and second positions of the column structure.

4,709,767

PRODUCTION PROCESS FOR MANUFACTURING LOW MOLECULAR WEIGHT WATER SOLUBLE ACRYLIC POLYMERS AS DRILLING FLUID ADDITIVES

William Alexander, Naperville, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Filed Jan. 6, 1986, Ser. No. 816,290
Int. Cl.[4] E21B *21/00*
U.S. Cl. 175—65 **11 Claims**

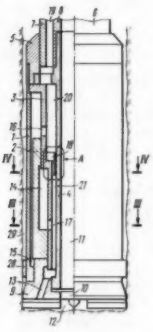
1. A method of drilling comprising mixing a monomer solution of an acrylic monomer neutralized 0 to 100 mole percent; and water to form a mixed monomer solution, wherein the monomers of the mixed monomer solution consist essentially of one or more acrylic monomers; and the monomer concentration is 50–90 percent by weight of the monomer solution prior to polymerization initiation, and the water concentration is 1% to 40% of the monomer solution prior to polymerization initiation; and initiating polymerization of the acrylic monomer while limiting the weight average molecular weight of the acrylic polymer to 1,000 to 50,000 such that during polymerization, the exothermic heat of reaction is substantially the only heat energy used to accomplish polymerization, and to drive off sufficient water to form a solid, essentially uncrosslinked, water-soluble acrylic polymer having a water content of 15 percent by weight or less, and thereafter adding said water-soluble polymer in an effective amount up to about 0.03 pounds per barrel to a drilling fluid surrounding a drill bit to lower the viscosity of the drilling fluid during drilling of a bore hole.

4,709,768

ANNULAR AIR HAMMER APPARATUS FOR DRILLING WELLS

Alexandr D. Kostylev; Vladimir P. Boginsky; Boris N. Smolyanitsky; Jury N. Syryamin; Boris B. Danilov, all of Novosibirsk; David I. Kogan, and Vyacheslav N. Saveliev, both of Moscow, all of U.S.S.R., assignors to Institut Gornogo Dela So An USSR, Novosibirsk, U.S.S.R.

Filed Sep. 2, 1986, Ser. No. 902,671
Int. Cl.[4] E21B *4/14*
U.S. Cl. 175—296 **7 Claims**



1. An annular air hammer apparatus for drilling wells, comprising:

a cylindrical body;

a hammer received coaxially for reciprocations from a top position to a lower position in said body;

a stepped air distribution tube rigidly secured in said body and cooperating with said hammer;

a work stroke chamber defined between said air distribution tube and said hammer;

a return stroke chamber defined between said body and said air distribution tube;

a pipe for receiving drillings mounted in stationary disposition in said air distribution tube and having an interior space for the removal of drillings from the well bottom;

a plenum defined between said pipe and said air distribution tube;

a source of a gaseous fluid under pressure;

said plenum having an inlet establishing permanent communication between said plenum and said source of a gaseous fluid under pressure;

admission ports in the upper step of said air distribution tube for alternately communicating said plenum with said return stroke chamber when said hammer is in the lower position;

exhaust ports in the lower step of said air distribution tube;

a rock breaking tool mounted in the lower part of said body for axial movements;

an axial passage in said rock breaking tool, for providing communication between said pipe and the exterior of the hammer apparatus;

blowing passages in said rock breaking tool for feeding the gaseous fluid under pressure to said pipe for receiving drillings and for removing broken rock therethrough to the surface;

an annular member provided between said pipe for receiving drillings and said air distribution tube in the zone between said admission ports and said exhaust ports of the air distribution tube;

an exhaust chamber defined by said annular member between the outer surface of said pipe for receiving drillings and inner surface of said air distribution tube, the exhaust chamber alternately communicating through said exhaust ports of the air distribution tube with said work stroke chamber when the hammer is in the lower position and with said return stroke chamber when the hammer is in the upper position and;

a throttle means provided between said pipe for receiving drillings and said air distribution tube, the throttle means being located below the admission ports, said exhaust chamber permanently communicating with said plenum through the throttle means.

4,709,769

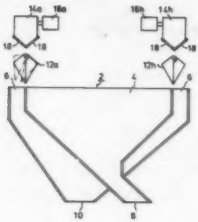
COMBINATION WEIGHING METHOD

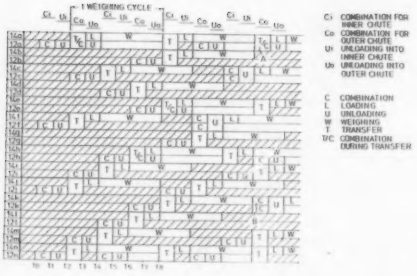
Shoji Yamano, Akashi, and Isao Miyamoto, Himeji, both of Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan

Continuation-in-part of Ser. No. 788,388, Oct. 17, 1985, Pat. No. 4,706,766. This application Nov. 5, 1986, Ser. No. 927,251
Claims priority, application Japan, Oct. 26, 1984, 59-226473
Int. Cl.[4] G01G *19/22*
U.S. Cl. 177—1 **19 Claims**

1. A combination weighing method comprising a transfer step for transferring product to empty ones of a plurality of auxiliary hoppers arranged to receive product from a plurality of weighing hoppers respectively, from those weighing hoppers corresponding to said empty auxiliary hoppers; a loading/weighing step for feeding product to said weighing hoppers having emptied by transferring the product to said empty auxiliary hoppers, and weighing the same; and a combination/unloading step effected in parallel with said transfer step and said loading/weighing step for repeatedly combining in various fashion the weights of said product having been transferred to said auxiliary hoppers and selecting from the resultant combinations a combination whose sum weight is

equal or approximate to a predetermined weight, and unloading the hoppers of the selected combination to make a delivery,





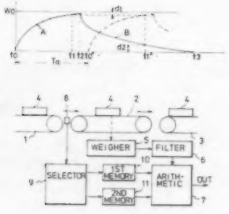
successive deliveries of product from said auxiliary hoppers being received concurrently by a pair of receiving device.

4,709,770

DEVICE FOR CORRECTING DYNAMIC WEIGHT SIGNAL FROM CONVEYER WEIGHER

Toru Kohashi, and Motoyuki Adachi, both of Hyogo, Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan

Filed Dec. 2, 1986, Ser. No. 937,105
Claims priority, application Japan, Dec. 5, 1985, 60-274797
Int. Cl.[4] G01G *19/52, 23/10*
U.S. Cl. 177—50 **6 Claims**



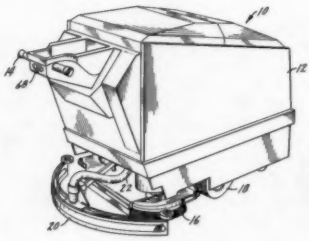
1. A device for correcting dynamic weight signals provided by a conveyer weigher through a filter for removing the vibration components of said signals to obtain corresponding static weight signals, including first memory means for storing a first correction constant and arithmetic means for applying a correction computation to said dynamic weight signals based upon said first correction constant; characterized by said device further including second memory means for storing a second correction constant, means for detecting each article fed to said weigher to produce a detection signal, and selection means responsive to said detection signals for measuring the time interval between adjoining articles fed to said weigher to apply the content of said first memory to said arithmetic means when the measured value is less than a predetermined value and to apply the content of said second memory means to said arithmetic means when the measured value is greater than said predetermined value.

4,709,771

SPEED AND STEERING CONTROL FOR A FLOOR MAINTENANCE MACHINE

Michael T. Basham, Maple Grove; Robert M. Berdahl, Plymouth, and Bruce E. Field, Minneapolis, all of Minn., assignors to Tennant Company, Minneapolis, Minn.

Filed Apr. 21, 1986, Ser. No. 853,865
Int. Cl.[4] B62D *51/04, 11/04*
U.S. Cl. 180—6.5 **11 Claims**



1. A drive control for a vehicle including,

first and second drive motors, each arranged to drive a vehicle wheel, means responsive to an operator command for providing an electrical signal representative of a desired speed for the vehicle, means for translating the speed signal into drive signals for each motor,

binary means for detecting an operator turning command, and means for changing one of the motor drive signals in response thereto, selected in accordance with the turning command, from its level representative of the motor speed just prior to the turning command toward a no-speed level at a programmed rate in accordance with a voltage ramp, with the initial point for the ramp being the motor drive signal representative of the motor current just prior to the turning command and the end point of the ramp being a signal representative of no motor current, and wherein said means for changing the motor drive signal includes means for progressively restoring said one of the motor drive signals when the operator turning command is terminated.

4,709,772

MOTORIZED MOVING DEVICE

Pierre Brunet, 12 Rue Ancienne Ferme, 38120 Saint-Egreve, France

Filed Jan. 24, 1986, Ser. No. 822,040
Claims priority, application France, Jan. 31, 1985, 85 01389
Int. Cl.[4] B62B *5/02;* **B60B** *19/00*
U.S. Cl. 180—8.2 **6 Claims**

1. A motorized vehicle for transporting a person or an object over an external configuration which includes a flat surface, steps up and steps down, said vehicle comprising:

a. a chassis equipped for receiving a person or object to be transported;

b. a first axle mounted on said chassis in a lower region thereof for pivotal movement on a first axis;

c. frame means fixed to an end of said first axle;

d. at least three wheels pivotally supported on said frame means;

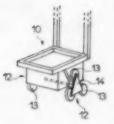
e. first reversible electric-motor drive means coupled to said first axle for rotating said first axle;

f. a second axle mounted on said chassis for pivotal movement on said first axis, said first and second axles being

coaxially and concentrically mounted on said first axis, said first axis being the sole axle-axis on said chassis, said second axle being coupled to said three wheels;

g. second reversible electric-motor drive means coupled to said second axle for selectively rotating said second axle thereby to rotate said three wheels independently of the rotation of said first axle;

h. detector means on said chassis for detecting the tilt of said chassis;



i. means on said chassis for detecting counter electromotive force of the second drive means; and

j. control means for actuating said first and second drive means in respose to signals from both detector means, said tilt detector means acting through said control means on said first drive means to maintain a constant frame tilt by accelerating, slowing down, or reversing the direction of rotation of said first drive means in response to signals from said tilt detector means.

4,709,773

VARIABLE GEOMETRY TRACK VEHICLE

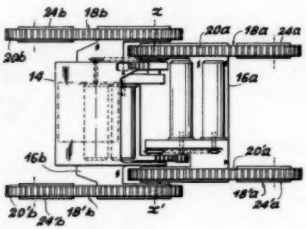
Gilles Clement, Paris, and Eric Villedieu, Palaiseau, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 17, 1986, Ser. No. 875,325

Claims priority, application France, Jun. 21, 1985, 85 09485

Int. Cl.[4] B62D *55/04*

U.S. Cl. 180—9.32 **2 Claims**



1. A tracked vehicle comprising two to four tracked bodies and at least one non-tracked body, each of the tracked bodies having at least one track, the total number of tracks of the vehicle being three or four, the tracked bodies and the non-tracked bodies all being articulated about a common axis, wherein the vehicle also comprises means for permanently maintaining the vertical passing through the centre of gravity of the vehicle within the support polygon thereof, including control means acting on an angulation motorization means for the non-tracked body about the common axis, in order to make said angulation dependent on a position reference, wherein the control means are sensitivie to signals supplied by sensors for the relative positioning between tracked and nontracked bodies and by a vertical position sensor carried by one of these bodies, and motorization means carried by the tracked bodies and placed within envelopes defined by the tracks of said tracked bodies.

4,709,774

MOTORCYCLE

Naoyuki Saito, and Motoo Ozawa, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 654,786, Sep. 26, 1984, abandoned. This application Jul. 25, 1986, Ser. No. 888,635

Claims priority, application Japan, Sep. 26, 1983, 58-148610[U]

The portion of the term of this patent subsequent to Feb. 18, 2003, has been disclaimed.

Int. Cl.[4] B60K *11/04, 11/08*

U.S. Cl. 180—229 **12 Claims**

1. A motorcycle comprising:

(a) a motorcycle body having a longitudinal axis;

(b) a motorcycle frame;

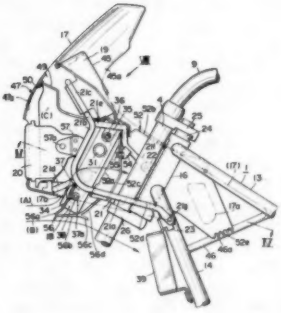
(c) a head pipe fixedly mounted on a front end of said motorcycle frame and inclined rearwardly with respect to a vertical line;

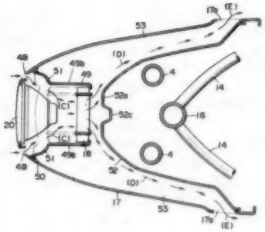
(d) a radiator disposed forwardly of said head pipe substantially parallel to an axis thereof and positioned in a plane lying normally to the longitudinal axis of said motorcycle body;

(e) an instrument cluster unit disposed in a slanted plane extending upwardly and forwardly from above said radiator;

(f) a headlight disposed in a recess defined between said instrument cluster unit and said radiator, said recess having a substantially V shape as viewed in side elevation, and said headlight being disposed forwardly of said radiator in front of said head pipe;

(g) a fairing covering said headlight, said radiator, and said instrument cluster unit; and





(h) a single attachment frame by which said radiator, said instrument cluster unit, and said headlight are supported on said motorcycle frame.

4,709,775

TORQUE CONTROL SYSTEM FOR VEHICLES

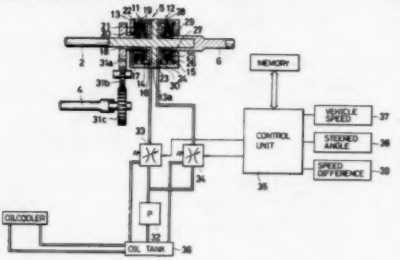
Kenichi Watanabe; Hideshi Hiruta, and Manabu Hiketa, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Aug. 29, 1986, Ser. No. 901,776

Claims priority, application Japan, Aug. 30, 1985, 60-191033; Aug. 30, 1985, 60-191035; Sep. 20, 1985, 60-206271

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—233 **13 Claims**



10. A torque control system for vehicles provided with four-wheel drive system including a power plant producing a drive torque for driving wheels, torque transmitting mechanisms for transmitting the drive torque from the power plant to front and rear wheels respectively, and power transiting means provided in at least one of said power transmitting mechanisms for changing the amount of the drive torque transmitted therethrough so that the torque distribution ratio between the front and rear wheels can be controlled, CHARACTERIZED IN THAT the torque control system further comprises actuator means for operating said power transmitting means to control said torque distribution ratio vehicle speed detecting means for detecting a vehicle speed, steering angle detecting means for detecting a steered angle of the steering wheel, speed difference detecting means for detecting a rotation speed difference between the front and rear wheels, torque control means for determining a control factor for operating said actuator means in accordance with the speed difference under a given vehicle speed and a given steering angle so that the torque distribution ratio between the front and rear wheels is maintained at a desirable constant value wherein said power transmitting means are provided in a torque transmitting path for transmitting the drive torque from the power plant to the front wheels, and the system including a transmission disposed in the vicinity of an engine located transversely at front portion of an vehicle body, the transmission being provided with an input and output shaft extending in the axial direction of the output shaft of the engine, a ring gear in meshing engagement with an output gear of the transmission, a front differential gear mechanism relatively rotatable with the ring gear extending through the central portion of the ring gear, a hydraulic clutch disposed on the same axis as the ring gear so as to control engagement and disengagement between the ring gear and the front differential mechanism and changing the amount of the drive torque transmitted through the clutch device in accordance with a hydraulic pressure, and a rear wheel drive mechanism in meshing engagement with the ring gear for transmitting the drive torque from the engine to the rear wheels.

4,709,776

AUTOMATIC POWER DOOR LOCK SYSTEM

Marcus C. Metz, Canton, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jul. 7, 1986, Ser. No. 882,568

Int. Cl.[4] B60K *28/12*

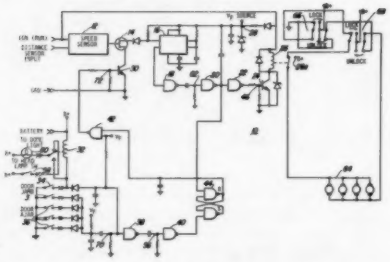
U.S. Cl. 180—281 **5 Claims**

1. An automatic power door lock system for automatically locking door locks of a motor vehicle after a door is opened or becomes ajar while the ignition of the vehicle is on and after the vehicle reaches a predetermined speed, said system comprising:

(a) speed sensor means connected to a distance sensor of the vehicle for providing to the system a pulse signal indicative of the speed of the vehicle so that the system will know when the vehicle reaches the predetermined speed;

(b) door jamb switch means mechanically connected to the door of the vehicle for providing an electrical signal to the system indicative of the door being opened;

(c) a door ajar switch mechanically connected to the door and having a switch contact connected between an electrical signal source and said door jamb switch means for providing an electrical signal to the system indicative of the door being in an ajar position; and



(d) a drive means connected to the door lock for driving the lock to a lock position; and

(e) bi-stable latch means interconnected to said speed sensor means, said door jamb switch means and said drive means responsive to the electrical signal from said door jamb switch means indicating the door being opened or ajar and to the speed of the vehicle pulse signal from said speed sensor means, for providing an electrical signal to said drive means to cause said drive means to drive the door lock to a lock position when the vehicle reaches the predetermined speed.

4,709,777

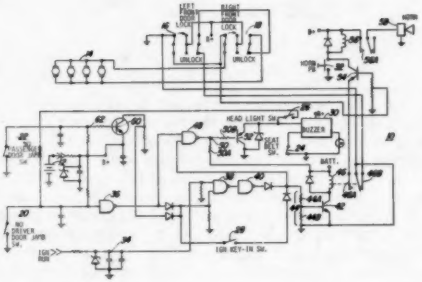
VEHICLE POWER DOOR LOCKS, IGNITION KEY INTERLOCK SYSTEM THEREFOR

Marcus C. Metz, Canton, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jul. 7, 1986, Ser. No. 882,656

Int. Cl.[4] B60K *28/00*

U.S. Cl. 180—286 **6 Claims**



1. An interlock system for an automotive vehicle with power door locks for preventing the accidental locking of the vehicle while the ignition key is in an ignition key cylinder, the vehicle being either the type having a tilt or non-tilt steering column, the ignition key cylinder being the type wherein the ignition key is positioned to the OFF, ACCESSORY or IGN-

RUN position without starting or causing an engine of the vehicle to operate, said system comprising:

a. means for detecting the presence of the ignition key positioned in the ignition key cylinder in the OFF and ACCESSORY positions;

b. means for detecting the presence of the ignition key positioned in the ignition key cylinder in the IGN-RUN position;

c. driver door jamb switch circuit means mechanically connected to a driver door of the vehicle for providing an electrical signal to the system indicative of the driver door being opened;

d. driver door audible indication means connected to said driver door jamb switch circuit means, said ignition key in IGN-RUN position detection means and said ignition KEY-IN in position detection means for providing an audible sound when the driver door is opened while the ignition key is in the IGN-RUN, OFF and ACCESSORY positions;

e. passenger door jamb switch circuit means mechanically connected to a passenger door of the vehicle for providing an electrical signal to the system indicative of the passenger door being opened;

f. means for inhibiting the power door lock circuits in response to the passenger door and/or the driver door being opened while the ignition key is positioned in the ignition key cylinder in the ON, OFF or ACCESSORY position; and

g. vehicle horn activation means for turning on the vehicle horn in response to the power door locks being inhibited by said power door lock inhibiting means.

4,709,778

VEHICLE DRIVE UNIT

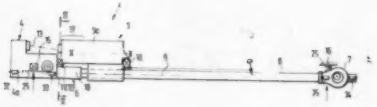
Rolf von Sivers, Rutesheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed May 14, 1985, Ser. No. 733,785

Claims priority, application Fed. Rep. of Germany, May 14, 1984, 3417815

Int. Cl.[4] B60K *5/12*

U.S. Cl. 180—292 **13 Claims**



1. A vehicle drive unit comprising:

a combustion engine supported at the vehicle structure by elastic bearing means,

a transmission,

a transmission shaft drivingly connecting the engine and the transmission,

a transfer case drivingly connectible with the transmission,

first and second differentials drivingly connectible with the transmission and transfer case,

a drive shaft for drivingly connecting the transmission with the second differential, said drive shaft being supported at a support member,

said support member being rigidly connected with the transmission,

said elastic bearing means including first and second elastic bearing support means,

said first elastic bearing support means arranged between the combustion engine and the support member for vibrationally isolating the combustion engine with respect to the support member for the drive shaft,

said second elastic bearing support means arranged between the combustion engine and the transmission for vibrationally isolating the combustion engine with respect to the transmission, and

said transmission shaft exhibiting low torsional rigidity and being associated with inertial masses in such a manner as to provide a damping effect on torque transfer induced vibrations.

4,709,779

VIBRATION DAMPING SYSTEM FOR POWER UNIT

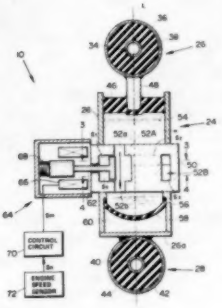
Shin Takehara, Higashihiroshima, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Feb. 20, 1986, Ser. No. 831,286

Claims priority, application Japan, Feb. 20, 1985, 60-32444

Int. Cl.[4] F16F *9/50*

U.S. Cl. 180—300 **22 Claims**



1. A vibration damping system for a power unit of vehicle, said vibration damping system comprising:

mounting devices for supporting a power unit from a vehicle body;

a damper operatively disposed between the power unit and the vehicle body, said damper operatively disposed independently from said mounting devices so that said mounting devices receive the static load of the power unit, said damper including.

a first connecting section connected to the power unit;

a second connecting section connected to the vehicle body,

a first elastic wall member connected to one of said first and second connecting sections and defining a first fluid chamber,

a second elastic wall member defining a second fluid chamber,

means for defining a communication passage through which said first and second fluid chambers are communicable with each other, and

a fluid filled in said first and second fluid chambers and said communication passage; and

means for changing volume of said communication passage in response to engine speed of the power unit.

4,709,780

EXHAUST DISSIPATOR/DISRUPTER DEVICE

Edward T. Piesik, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 27, 1985, Ser. No. 813,817

Int. Cl.[4] F02K *1/44*

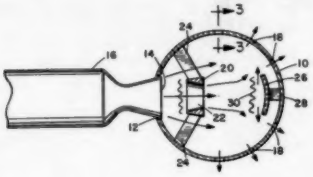
U.S. Cl. 181—213 **7 Claims**

1. A dissipator device for connection to a rocket exhaust, comprising:

a container having an inlet at an intermediate point in its length for connection to a rocket exhaust and a plurality of outlet exhaust orifices of smaller dimensions than the inlet for exhaust flow out of the container in a plurality of different directions;

a solid deflector surface in the container opposite the inlet for deflecting incoming exhaust flow out of the incoming flow direction and into deflected flow directions generally normal to the incoming flow direction; and

disrupter means in the container in the path of incoming exhaust flow between the inlet and the deflector surface for reducing the pressure of exhaust gases downstream of the disrupter means, the disrupter means comprising a disrupter member spaced from the inlet having a through bore aligned with the inlet, the through bore having an inlet opening at one end positioned closest to the inlet of



an area less than the cross-sectional area of the exhaust flow at the inlet opening and shaped for restricting the exhaust gas flow and directing it through and around the disrupter member.

4,709,781

SOUND-DAMPING AND HEAT-INSULATING COMPOSITE PLATE

Wilhelm Scherzer, Berndorf, Austria, assignor to Austria Metall Aktiengesellschaft, Braunau am Inn, Austria

Filed Nov. 18, 1985, Ser. No. 799,160

Claims priority, application Austria, Nov. 16, 1984, 3632/84

Int. Cl.[4] E04B *1/82*; B32B *15/06*

U.S. Cl. 181—290 **7 Claims**

1. A sound-damping composite body consisting essentially of two metal cover layers and a porous core layer, said core layer being positioned between the two metal cover layers and bonded to each of said metal layers, said core layer being composed of interbonded particles of rubber forming pores between them.

4,709,782

SKID-OUT HIGHRISE FIRE ESCAPE DEVICE

Henry Lipinski, 1832-20th St., Wyandotte, Mich. 48192, assignor to Henry Lipinski; Theresa Janet Lipinski; James Robert Sobocienski and Lorraine Sobocienski, all of Wyandotte, Mich.

Filed Jan. 13, 1987, Ser. No. 2,953

Int. Cl.[4] A62B *1/20*

U.S. Cl. 182—3 **60 Claims**

1. An emergency gravity operated fire escape apparatus particularly useful for egressing from highrise type structures, which in combination, comprises:

a skid track vertically disposed and in a spaced relationship to a wall of a structure having a ground end, said skid track having a front side and a back side with a partition interposed between the front and the back side forming a guide channel and a back section having an inside wall, a longitudinal aperture disposed the length of the front side of said skid track and a plurality of doors disposed along said skid track's front side;

a plurality of descent retarders uniformly disposed within the back section of said skid track and partially protruding into the guide channel of said track through a rectangular aperture disposed within the partition, said descent retarder having a plane frictional surface and rear portion;

means for controlling said descent retarders horizontal displacement, said means for controlling being disposed within the back section of said skid track and placed between the rear of said descent retarder and the inside of the back side of said skid track; and

a skid disposed within the guide channel of said skid track, said skid having a back and bevel front portions with a handle affixed to the back and a loop affixed near the bevel front portion; whereby a harness may be attached to the loop of said skid, allowing the user to safely and slowly descend to the ground during an emergency exit from a highrise structure.

4,709,783

APPARATUS FOR INSTALLING ESCAPE DEVICE FOR SLOWLY LOWERING A BODY

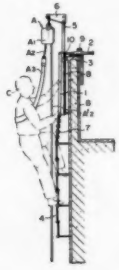
Hisatsugu Tomioka, Ibaraki; Tatsuo Waki, and Yoshiki Miyata, both of Tokyo, all of Japan, assignors to Lonseal, Tokyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,373

Claims priority, application Japan, Dec. 29, 1984, 59-201969[U]; Nov. 16, 1985, 60-177167[U]

Int. Cl.[4] A62B *1/16*

U.S. Cl. 182—8 **25 Claims**



1. An apparatus for supporting an escape device for slowly lowering a person from a structure toward the ground comprising:

(a) a ladder assembly having an upper portion for mounting said ladder assembly to said structure, with at least two horizontal bars mounted to said upper portion; and

(b) at least two vertical rods mounted on said at least two horizontal bars such that a gate-like shape is formed by said ladder assembly upper portion, said at least two horizontal bars, and said at least two vertical rods, wherein each of said vertical rods is substantially L-shaped in cross-section and has at least one substantially horizontal cylindrical portion which is adapted to receive one horizontal bar, each said horizontal cylindrical portion being attached to one end of a substantially vertical portion of each said vertical rod and further comprising a threaded section which is adapted to receive a screw for detachably connecting said horizontal bars and said vertical rods to

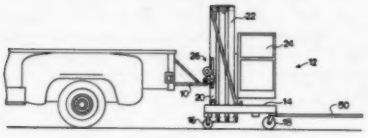
each other, said vertical portions having second ends attached to each other by a lower horizontal member, wherein a portion of said structure is held by and between said ladder assembly and said at least two vertical rods.

4,709,784

APPARATUS FOR AIDING IN LOADING A MOBILE WORK PLATFORM ONTO AN ELEVATED SURFACE

Lyle D. Grider, 25990 North Oak Hills Road, Barrington, Ill. 60010

Filed Mar. 30, 1987, Ser. No. 31,455
Int. Cl.[4] E04G *1/24*
U.S. Cl. 182—16 **15 Claims**



1. In a mobile work platform apparatus having a base member and a side extension thereof extending upwards from the base, the improvement comprising:

a surface engaging pivot means fixed to said side of said base member; and

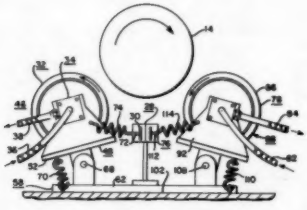
anti-friction means mounted to said side of said base member proximate said pivot means and arranged to support the weight of the mobile work platform when positioned on its side.

4,709,785

RETROFIT FRICTION-HYDROSTATIC EMERGENCY LUBRICATION SYSTEM FOR A LARGE ROTATING SHAFT

Michael Csanady, Jr., Ridley Park, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 2, 1986, Ser. No. 902,728
Int. Cl.[4] F01M *1/00*
U.S. Cl. 184—6.4 **14 Claims**



1. A retrofit friction-hydrostatic emergency lubrication system for supplying lubricating oil to a bearing means for a large rotating shaft during electrical power outage, said bearing means for carrying and maintaining said shaft in a position, lubrication means for lubricating said bearing means, said lubrication means including oil supply tank means, pump means for pumping lubricating oil to said bearing means, first piping means in fluid communication with said oil supply tank means and said bearing means, said retrofit friction-hydrostatic emergency lubrication system comprising:

(a) first sensing and actuator means for sensing and responding to a first predetermined low oil pressure at said bearing means;

(b) first rotatable friction means for contacting said shaft, said first sensing and actuator means upon detecting said first predetermined low oil pressure at said bearing means causing said first friction means to contact said shaft;

(c) first high pressure pump means having an intake and a discharge, said first high pressure pump means driven by said friction means;

(d) second piping means in fluid communication with said first high pressure pump means and said oil supply tank means;

(e) hydraulic motor pump means in fluid communication with said discharge of said first high pressure pump means, said hydraulic motor pump means driven by said discharge of said first high pressure pump means; and

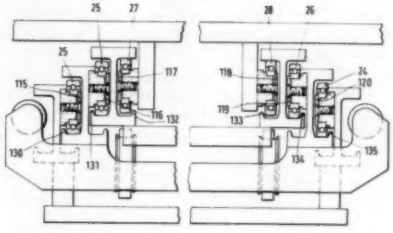
(f) first oil supply tank pump means disposed within said oil supply tank means, said first oil supply tank pump means driven by said first hydraulic motor pump means, whereby when said first predetermined low oil pressure is detected during shaft coastdown, the inertia of said shaft drives said emergency lubrication system to maintain an adequate flow of oil to said bearing means.

4,709,786

INDUSTRIAL TRUCK, PARTICULARLY HIGH-LIFT TRUCK, ALSO AS A HIGH-LIFT TRUCK HAVING A DISPLACEABLE MAST

Bernd David, Henstedt-Ulzburg, and Alfred Klingberg, Norderstedt, both of Fed. Rep. of Germany, assignors to Jungheinrich Unternehmensverwaltung KG

Filed Jan. 30, 1986, Ser. No. 824,159
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1985, 3503359; Aug. 19, 1985, 3529601
Int. Cl.[4] B66B *9/20*
U.S. Cl. 187—9 E **8 Claims**



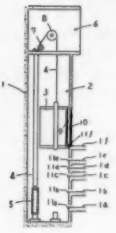
4. An industrial truck comprising a lifting frame and at least one vertically movable load-carrying carriage, wherein said lifting frame is provided with laterally disposed vertical rails, and rotatably mounted guide rollers are provided, said rails serve in alternation as carriers for said guide rollers, which are engageable with guideways of adjacent rails, or to provide guideways for such guide rollers, guide rollers are also provided on the load-carrying carriage and the guideways are provided at least on one side with a bordering ledge for a lateral guidance of the guide rollers, wherein the improvement resides in that at least part of the guide rollers (**20, 22, 30; 24, 26, 28; 102–104; 105, 106; 108, 109; 143**) are axially displaceable, the guideways (**127–129**) provided on one side of the lifting frame (**2**) and cooperating with associated guide rollers (**20, 22, 30; 20', 22' 30'; 24027, 65, 143**), which are axially fixed in their bearings, are wider than the tread of the respective associated guide roller, the guideways provided on both sides of the lifting frame (**2**) are provided with bordering ledges (**130–135**), which are raised from the guideways, and the thread of the guiding rollers (**24, 26–28**) disposed on one side is narrower than the guideway within the bordering ledge.

4,709,787

ELEVATOR

Eiji Uchino, 4-12, Kamo 2-chome, Takaishi-shi, Osaka-pref., Japan

Filed Jul. 14, 1986, Ser. No. 882,954
Claims priority, application Japan, Dec. 11, 1985, 60-191187
Int. Cl.[4] B66B *13/00*
U.S. Cl. 187—56 7 Claims



1. An elevator including a cage having a floor, said cage positioned within a vertical shaft inside a building having floors, comprising:

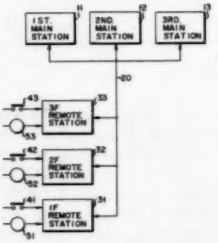
an elastic member comprising an elongated body with a right triangle cross-section placed between the front edge of said elevator cage floor and the building floor edge abutting said front edge of said elevator cage floor with one side lying in the plane of said elevator cage floor and the hypotenuse facing the bottom of said shaft and both the elevator cage and the building floor having sliding doors for permitting entry and exit to and from the cage only when the cage floor is level with the building floor.

4,709,788

GROUP CONTROL APPARATUS FOR ELEVATORS

Yutaka Harada, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 18, 1986, Ser. No. 875,876
Claims priority, application Japan, Jun. 28, 1985, 60-142156
Int. Cl.[4] B66B *1/18*
U.S. Cl. 187—124 12 Claims



1. A group control apparatus for elevators, comprising:

a plurality of main stations each for performing a hall call registration of an elevator cage, one of said main stations serving as a master main station for governing the hall call registration of said elevator cage, another of said main stations serving as a slave main station which is supplied from said master main station, and an address signal being used for receiving hall call data indicating said hall call registration;

a plurality of floor remote stations arranged in elevator halls of respective floors in a building in which elevators are installed, for generating said hall call data which calls said elevator cage, and performing a call display of said elevator cage; and

single data transmission means, for coupling each of said floor remote stations with each of said main stations, for performing serial data transmission of said hall call data between said floor remote stations and said main stations so that said hall call registration is effectted at each of said main stations, and for performing serial data transmission of said address signal between said master main station and said slave main station,

wherein when said master main station fails to stop the supply of said address signal on said single data transmission means for a period more than a predetermined period of time, said slave main station detects the failure of said master main station based on the absence of said address signal on said single data transmission means,

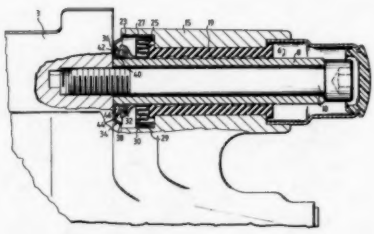
so that said slave main stations governs the hall call registration of said elevator cage in place of the failed master main station.

4,709,789

DUST COVER FOR CYLINDRICAL ELEMENTS OF THE TYPE FOR USE IN A PIN GUIDE ARRANGEMENT OF A SPOT-TYPE DISC BRAKE

Erhard Czich, Eppstein/Bremthal; Peter Drott, Frankfurt am Main, and Horst Haefner, Steinbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 22, 1986, Ser. No. 855,079
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1985, 3514497
Int. Cl.[4] F16D *65/09, 65/02*
U.S. Cl. 188—73.44 5 Claims



1. A dust cover for use in a pin guide arrangement of a spot-type disc brake, comprising an elastic folded sleeve having a first end section including means adapted to be stationarily, sealingly received against a first cylindrical element associated with an attachment member of said pin guide arrangement and a second end section including means adapted to be rotationally, sealingly mounted to the circumference of a second cylindrical element of said pin guide arrangement including a ring providing at said second end section, said ring being a substantially U-shaped configuration in longitudinal section an inner diametrical portion of said ring adapted to be stationarily mounted on said second cylindrical element, said ring at least partly surrounds said second end section of said folded sleeve, and said second end section being sealingly, rotatably mounted inside the U-shaped portion of said ring, an outer diametrical portion of said ring adapted to abut against said first cylindrical element.

4,709,790

CONTINUOUSLY ADJUSTABLE LENGTH ADJUSTMENT DEVICE

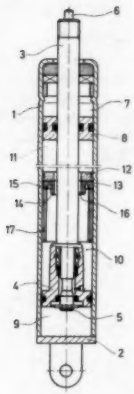
Herbert Freitag, Koblenz; Castor Fuhrmann, Brachtendorf, and Hans-Josef Hosan, Neuwied, all of Fed. Rep. of Germany, assignors to Stabilus GmbH, Koblenz-Neuendorf, Fed. Rep. of Germany

Filed Oct. 3, 1985, Ser. No. 783,840

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1984, 3437098

Int. Cl.[4] F16F 9/44

U.S. Cl. 188—300 **18 Claims**



1. A continuously adjustable length adjustment device wherein

(a) a cylindrical container is provided having an axis, two end walls, namely a first and a second end wall and a cavity between said two end walls;

(b) a piston rod axially extends inwards and outwards of said cavity through said first end wall;

(c) a piston unit is connected with said piston rod within said cavity and divides said cavity into two subcavities, a first subcavity adjacent said first end wall and a second subcavity adjacent said second end wall;

(d) said first subcavity contains an elastically compressible compensation volume adjacent said first end wall and a hydraulic volume adjacent said piston unit;

(e) said hydraulic volume and said second subcavity are filled with a hydraulic liquid;

(f) said hydraulic volume and said second subcavity are interconnected by passage means;

(g) voluntarily operable valve means are provided for opening and closing said passage means;

(h) an annular partition unit is provided within said hydraulic volume axially intermediate said elastic compensation volume and said piston unit, said partition unit separating said hydraulic volume into a first subvolume adjacent said elastic compensation volume and a second subvolume adjacent said piston unit;

(i) throttled throughflow means interconnect said first and second subvolumes such that a pressure difference occurs between a higher pressure within said second subvolume and a lower pressure in said first subvolume in response to traction acting onto said piston rod in the sense of extraction of said piston rod from said container in the closed state of said voluntarily operable valve means; and

(k) locking means are provided for preventing extraction of said piston rod, said locking means being exclusively responsive to said pressure difference so as to enter a locking condition before said piston unit mechanically engages said locking means.

4,709,791

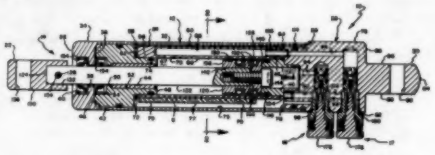
ADJUSTABLE DOUBLE-ACTING DAMPER

Benjamin T. Houghton, Tonawanda, N.Y., assignor to Enidine Incorporated, Orchard Park, N.Y.

Filed May 23, 1985, Ser. No. 737,326

Int. Cl.[4] F16F 9/34

U.S. Cl. 188—315 **17 Claims**



1. A damper for acting between two relatively movable objects comprising:

housing means adapted to be operatively connected to one of said objects;

piston means comprising a head within said housing means and a rod extending from said housing means adapted to be operatively connected to the other of said objects, said housing means including means defining an elongated cavity for containing hydraulic fluid, said piston head being received by said cavity so as to separate said cavity into a first variable-volume chamber and a second variable-volume chamber and adapted to slidably move relative to and along the length of said elongated cavity and thereby vary the volumes of said first and second chambers in response to relative movement between said two objects toward and away from one another, said housing means further including means defining an access opening, a first passage and a second passage, said first chamber communicating with said access opening through said first passage and said second chamber communicating with said access opening through said second passage; and

hydraulic fluid flow control means including a body sealingly accepted by said access opening and defining a passageway therethrough providing flow communication between said first and second passages and thereby providing a flow path for hydraulic fluid forced to flow between said first and second chambers as the volumes of said chambers are varied by said relative movement of said two objects toward and away from one another, said flow control means further including means associated with said body passageway for controlling the flow of hydraulic fluid in one direction through said passageway so that as hydraulic fluid is forced to flow through said passageway in said one direction, the damping effect of said damper is controlled, said passageway including a ball chamber having a flow inlet end and flow outlet end and said means associated with said passageway including a spherical ball received by said ball chamber, said ball adapted to be biased toward the ball chamber inlet or outlet end having the lower fluid pressure, one of said inlet and said outlet ends being of such a conformation that when hydraulic fluid pressure is lower at said one end than the fluid pressure at the other end, said ball and said one end cooperate to controllably restrict the flow of hydraulic fluid through said passageway, and the other of said inlet and said outlet ends being of such a conformation that when hydraulic fluid pressure is lower at said other end than the fluid pressure at said one end, said ball and said other end cooperate to permit substantially unrestricted flow of hydraulic fluid through said passageway, said one end of said ball chamber defining a contoured surface of such configuration that flow of hydraulic fluid through said one end is controlled by controlling the positional relationship of said ball to said contoured surface and said flow control means including adjustment means for adjusting the positional relationship of said ball to said contoured surface of said one end, said adjustment

means including ball-engaging means mounted for movement relative to and within said body passageway for moving said ball relative to said contoured surface between one positional relationship with and within said ball chamber and another such positional relationship, said body of said control means defining an elongated opening extending therethrough, one portion of said elongated opening defining at least a portion of said passageway and another portion of said elongated opening is internally-threaded along the length of said opening, said adjustment means including a plug member having a securement portion and a stem portion attached to said securement portion, said securement portion being rotatably and threadably accepted by said threaded portion of said opening for bodily movement of said plug member relative to and along the length of said elongated opening as said securement portion is rotated relative to said body of said control means, and said stem portion extending from said securement portion and into said ball chamber and engageable with said ball for moving said ball between said one positional relationship with said contoured surface and another as said securement portion is rotated relative to said body.

4,709,792

METHOD OF CONTROLLING CREEP PREVENTING DEVICE FOR VEHICLE EQUIPMENT WITH AUTOMATIC TRANSMISSION

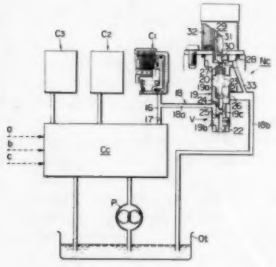
Shino Sakai, Saitama, and Masao Nishikawa, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 512,892, Jul. 11, 1983. This application Oct. 27, 1986, Ser. No. 924,177

Claims priority, application Japan, Jul. 12, 1982, 57-121055; Aug. 20, 1982, 57-144142

Int. Cl.[4] B60K *41/28*; F16D *43/28*

U.S. Cl. 192—0.044 **5 Claims**



1. In a creep preventing device for a vehicle equipped with an automatic transmission in which an oil discharge passage communicating with an oil tank is branched from an oil feed passage for supplying an operating oil pressure to a starting means of the automatic transmission and an electromagnetic valve capable of closing said oil discharge passage under the demagnetized state and opening the same under the excited state is disposed in said oil discharge passage, a method of controlling the creep preventing device comprising the steps of:

chopping a power feed circuit controlling said electromagnetic valve a predetermined number of times in the course of the creep preventing device coming into an inoperative state in response to the release of an associated brake pedal when said electromagnetic valve is returned from the excited state to the demagnetized state; and

stopping the chopping of the power feed circuit to immediately bring the electromagnetic valve into the demagnetized state, when an associated accelerator pedal is pressed during the chopping step of the power feed circuit of the electromagnetic valve thereby rendering the creep preventing device inoperative for swift connection of said starting means.

4,709,793

PARKING MECHANISM FOR TRANSMISSIONS

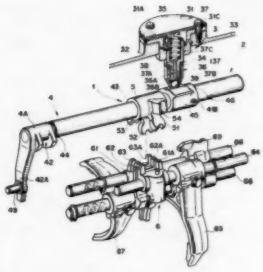
Shiro Sakakibara, and Kazuhisa Ozaki, both of Anjo, Japan, assignors to Aisin-Warner Limited, Japan

Filed Feb. 20, 1985, Ser. No. 703,676

Claims priority, application Japan, Feb. 22, 1984, 59-31853

Int. Cl.[4] B60K *41/26, 20/02*

U.S. Cl. 192—4 A **8 Claims**



2. A parking mechanism for transmission, comprising:

an input shaft,

an output shaft located in a coaxial relationship with said input shaft, and having a plurality of driven gears,

a countershaft located in parallel with said input shaft, and having a plurality of drive gears constantly meshed with said driven gears;

a plurality of dog clutches selectively coupled between one of said driven gears and said output shaft,

a plurality of parallel shifter rails disposed in parallel with said input shaft, each of said shifter rails having a shifter fork fixed thereon for axial movement with said shifter rail into engagement with one of said dog clutches, each of said shifter rails also having a shifter arm mounted thereon, each of said shifter arms having a groove therein;

a select and shifter shaft disposed in parallel with said shifter rails, and an annular member fixed to said select and shifter shaft for movement therewith, said annular member having a plurality of coupling members, said coupling members being engaged in said grooves, by rotation of said select and shifter shaft, for axial movement of one of said shifter rails, and

a parking coupling member for the parking position provided on the annular portion of said select and shifter shaft for engagement within the grooves of at least two of said shifter arms, by rotation of said select and shifter shaft, for axial movement of two shifter rails whereby the shifter fork on one of said two shifter rails is brought into operative engagement with a first of said dog clutches and the shifter fork on the other of said two shifter rails is brought into operative engagement with a second of said dog clutches establishing a parking position independent of other shift positions.

4,709,794

ELECTROMOTIVE VARIABLE-SPEED AND CONTROL DRIVE PARTICULARLY FOR USE IN INDUSTRIAL SEWING MACHINES

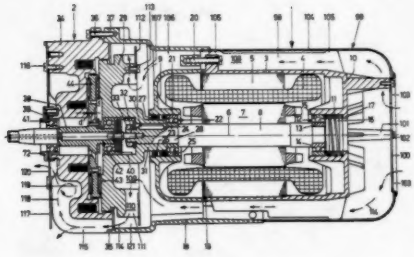
Karl Lengsfeld, Plankstadt; Erich Link, Brühl; Adolf Martin, Rheinstetten, and Hilmar Wittler, Karlsruhe, all of Fed. Rep. of Germany, assignors to Frankl & Kirchner GmbH & Co KG, Schwetzingen, Fed. Rep. of Germany

Filed Mar. 5, 1986, Ser. No. 836,258

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508227

Int. Cl.[4] F16D *67/06*

U.S. Cl. 192—18 B 4 Claims



1. An electromotive variable-speed and control drive particularly for use in industrial sewing machines comprising: a motor capable of continuous drive and having a motor shaft, a flywheel having a clutch surface and connected to said motor shaft, and a clutch-brake unit for selectively connecting said motor shaft to a drive shaft, said clutch-brake unit having a clutch-brake disk which is connected to said drive shaft non-rotatably with respect thereto, a non-rotatable brake bearing bracket having a brake surface, said clutch-brake disk being brought into friction engagement optionally with said brake surface of said brake bearing bracket, or optionally with said clutch surface of said flywheel, said clutch-brake disk having an armature ring, said brake bearing bracket including a clutch coil casing portion, a clutch coil in said clutch coil casing portion, said brake bearing bracket including a brake coil casing portion, a brake coil in said brake coil casing portion, said armature ring having a radially outer-lying ring portion, said clutch coil casing portion encompassing said radially outer-lying ring portion of said armature ring forming a first radial gap between said clutch coil casing portion and said ring portion, said ring portion forming an axial gap to said flywheel, said flywheel having a peripheral portion, said clutch coil casing portion encompassing said peripheral portion, said clutch coil casing portion and said peripheral portion of said flywheel forming a second radial gap therebetween, said armature ring having a brake friction layer, said brake coil casing portion being positioned radially within said brake friction layer and, with a small axial gap, in front of said armature ring, and an undercut in said clutch coil casing portion and confining said first radial gap on a side of said ring portion in said clutch coil casing portion and facing said brake bearing bracket, and radially-extending recesses confining said second radial gap, one of said recesses being provided in said clutch coil casing portion and another of said recesses being provided in at least one of said peripheral portion of said flywheel and said clutch coil casing portion.

4,709,795

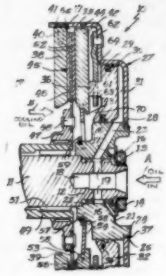
HYDRAULICALLY-ACTUATED STARTING CLUTCH ASSEMBLY WITH BALANCED PISTON ACTUATION

Ernest A. Ferris, Oakbrook, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 685,682, Dec. 24, 1984. This application Jul. 11, 1986, Ser. No. 884,347

Int. Cl.[4] F16D *25/063, 13/50*

U.S. Cl. 192—106 F 11 Claims



1. A starting clutch adapted to engage upon a signal from a throttle-induced system oil pressure to couple a driving shaft with a driven concentric sleeve shaft, comprising a hub operatively connected to rotate with the continuously rotating driving shaft, a clutch housing secured to said hub and having an intermediate step and an axial flange portion, said hub and stepped portion of the housing defining an annular pressure chamber therein receiving an axially reciprocable annular piston, a clutch plate carrying friction facings, a second hub operatively connected to the driven sleeve shaft and secured to the clutch plate, an end plate secured to said axial flange portion, a pressure plate axially reciprocable in said housing on the opposite side of the clutch plate from the end plate, a Belleville spring in said housing and operatively connected between said pressure plate and hub for driving rotation therewith, a plurality of axial projections on said piston contacting said pressure plate to move it against the clutch plate and end plate, and a source of hydraulic pressure communicating with said pressure chamber.

4,709,796

TORSION RUBBER TYPE DAMPER DISC

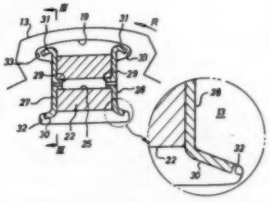
Norihisa Uenohara, Moriguchi, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Filed Oct. 8, 1985, Ser. No. 785,435

Claims priority, application Japan, Oct. 15, 1984, 59-155636[U]

Int. Cl.[4] F16D *3/14*

U.S. Cl. 192—106.1 5 Claims



1. A torsion rubber type damper disc, in which a flange is formed on an outer periphery of a hub, freely rotatable side plates are disposed on opposite sides of said flange, holes are formed in said flange and said side plates, said flange and said side plates being elastically interconnected with each other in

circumferential direction by a torsion rubber member in said holes seated on metal torsion rubber seats, claws are provided on said metal torsion rubber seats between said side plates at the inner and outer peripheral sides of said holes, said metal torsion rubber seats forming stoppers for said torsion rubber member; characterized by that said claws on said metal torsion rubber seats are bent outwardly and in the circumferential direction of said flange and said side plates away from said torsion rubber member to avoid interference between said torsion rubber member and said claws as said torsion rubber member is compressed and recessions for receiving said claws are formed on both circumferential faces of said flange hole under a free state of the disc.

4,709,797

CLUTCH DRIVEN PLATE

Luigi Cucinotta, and Orazio Di Benedetto, both of Milan, Italy, assignors to Automotive Products plc, Leamington Spa, England

Filed Sep. 10, 1986, Ser. No. 905,534
Claims priority, application Italy, Sep. 18, 1985, 22175 A/85
Int. Cl.[4] F16D *3/14, 3/64*
U.S. Cl. 192—106.2 **11 Claims**

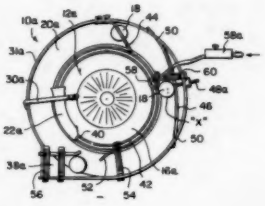
1. A driven plate for a clutch, said driven plate being rotatable about an axis of rotation, said driven plate comprising first and second annuli and an intermediate disc disposed between the annuli, said disc having a central opening centered on said axis, said opening being lined by axial splines, said disc being rotatable about said axis, said annuli and disc being keyed together by plug and socket connections whereby the annuli and disc rotate in synchronism, a friction material carrier comprising a first plate arrangement and a second plate arrangement, said first plate arrangement being axially spaced from said second plate arrangement, said first and second plate arrangements being fast one with the other for rotation in synchronism about said axis, said intermediate disc being disposed between the first and second plate arrangements, said first and second plate arrangements being in contact with the first and second annuli respectively, said first annulus being disposed between the first plate arrangement and the disc and said second annulus being disposed between the second plate arrangement and said disc, said first plate arrangement having a central opening in which the first annulus extends axially away from said disc, friction material in annular array being mounted on said carrier and disposed radially outwardly of the annuli, rotary motion about said axis being transmissible from the carrier to the intermediate disc and vice-versa, the carrier and the intermediate disc being capable of limited angular movement one relative to the other about said axis against action of resilient torsion damping means between the disc and carrier, and wherein said carrier rubs on said annuli during said relative angular movement.

4,709,798

ROTARY FEEDER TO ORIENT AND FEED BOTTLE CAPS AND SIMILAR PARTS

Michael Herzog, 135 Industrial Blvd., Riverhead, N.Y. 11901

Continuation of Ser. No. 708,074, Mar. 4, 1985, abandoned. This application Mar. 20, 1987, Ser. No. 28,044
Int. Cl.[4] B23G *7/12*
U.S. Cl. 198—380 **4 Claims**



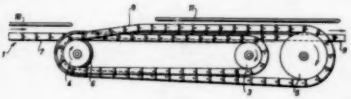
1. A rotary feeder for closure cap which caps have an external crown side and an internal cavity side bordered by a peripheral skirt, said feeder comprising in combination: a bowl, means mounting said bowl for rotation about a vertical axis, said bowl having a floor raised at the center on said axis and descending radially outward from said axis, and an annular ledge concentric with said axis and positioned above said floor; a stationary substantially vertical wall structure surrounding said ledge; a stationary ramp mounted within said bowl near the radially outer boundary of said bowl and having a lower ramp end for scooping up caps from said bowl and having an upper ramp end positioned alongside said ledge for depositing caps on said ledge for transport circumferentially about said axis with bowl rotation; said stationary wall structure being disposed for retaining said caps on said ledge in the presence of centrifugal force; first means disposed adjacent said ledge circumferentially downstream from said upper ramp end of said ramp for establishing a single level single file array of said caps around and on said ledge by returning to said bowl those caps on said ledge in excess of said single level single file array, said array consisting of caps with arbitrary orientation with regard to side up and side down; side stationary wall structure including circumferentially downstream of said first means an exit opening adjacent said ledge through which caps on said ledge reaching said exit opening are discharged; and second means mounted over said ledge between said first means and said exit opening for removing from said ledge and returning to said bowl any cap that is oriented crown side up, said second means including a portion of said stationary wall structure positioned to constrict the pathway immediately above said ledge so that caps passing said second means wall portion will be caused to overhang said ledge above said bowl, an air nozzle positioned above said ledge radially inward from said pathway constricting wall portion oriented to direct an air jet angled downward and radially outward toward both said ledge and said stationary wall structure, and means for feeding said nozzle with an adjustable air supply to produce an air jet whereby crown side up caps passing said second means blown off said ledge back into said bowl while the skirts of cavity side up caps are encountered by said air jet for urging said caps radially outward against said stationary wall structure to keep said cavity up caps on said ledge.

4,709,799

ARRANGEMENT FOR ORIENTING ARTICLES ON A CONVEYOR

Per-Allan Ljungberg, Lund, Sweden, assignor to Tetra Pak International AB, Lund, Sweden

Filed May 1, 1985, Ser. No. 729,204
Claims priority, application Sweden, May 8, 1984, 8402464
Int. Cl.[4] B65G 47/24
U.S. Cl. 198—412 8 Claims



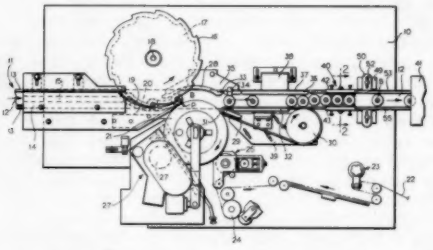
7. Conveyor apparatus for orienting objects on the conveyor while the conveyor is moving, comprising an endless conveyor element bendable laterally and vertically; guide means for guiding said element along a first path part, a second path part and a third path part with said first, second and third path parts being arranged to move at the same speed and substantially in the same direction; said first path part being substantially straight, said second path part having an upwardly inclined section and a raised section and a laterally progressive section and a straight section in sequence, and said third path part being parallel with said first path part and situated along one side thereof, said first path part being side by side with said second path part along said inclined section and vertically below said second path part along said straight section, said first and second path parts cooperating so that an incoming object on the first path part projects over onto the second path part, said second path part, because of its changing position relative to the first path part along said path, progressively orienting an object on the conveyor element and urging the object onto said third path part as said object moves along the conveyor.

4,709,800

BOTTLE CONVEYOR WITH BRUSH SPACER

Robert F. Olsen, Toledo, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio

Filed Apr. 28, 1986, Ser. No. 856,564
Int. Cl.[4] B65G 47/26
U.S. Cl. 198—459 4 Claims



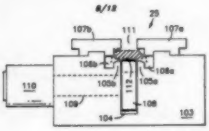
1. Apparatus for handling bottles that are exiting from a label applying machine in an upright attitude on a moving conveyor with means for spacing the bottles at evenly spaced intervals on said conveyor, said spacing means comprising a pair of opposed bottle engaging brushes extending along both sides of said conveyor at a height and relative spacing so as to engage opposite side walls of the bottles, said brushes exerting a holding force on said bottles that is greater than the frictional engagement of the bottles with the moving conveyor, and means for pushing bottles in bottle-to-bottle contact through the zone of engagement of said brushes with said bottles whereby the brushes slow the forward movement of the bottles so that all the bottles engaging the brushes are in surface to surface contact with adjacent bottles; and as soon as the foremost brush engaging bottle leaves the brush engaging area, the conveyor will speed up that bottle, thus creating spacing of the bottle from the next foremost bottle.

4,709,801

INPUT BUFFER AND ARTICLE INJECTOR MECHANISM FOR AN AUTOMATED ARTICLE HANDLER

Mavin C. Swapp, and Milo W. Frisbie, both of Mesa, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 815,853, Jan. 3, 1986, abandoned. This application May 22, 1987, Ser. No. 53,528
Int. Cl.[4] B65G 37/00
U.S. Cl. 198—464.2 5 Claims



2. An apparatus for use in handling a plurality of integrated circuits, said integrated circuits each comprising a body and leads extending from said body, said apparatus comprising:

guide means for guiding a plurality of said integrated circuits from an input end to an output end thereof, said guide means contacting a base of said integrated circuits;

alignment means for aligning said integrated circuits such that said guide means and said alignment means do not come in contact with said leads of said integrated circuits;

motive means for moving said integrated circuits along said guide means from said input end to said output end;

injector means for removing one of said plurality of integrated circuits from said output end;

first sensing means for sensing when said integrated circuit is in a position between said guide means and a plurality of work areas;

control means for controlling said injector means such that when an empty one of said plurality of work areas is positioned for receiving said integrated circuit, said control means will operate said injector means to inject said integrated circuit into said empty work area; and

second sensing means for sensing when said integrated circuit is in said work area.

4,709,802

MASS PRODUCT HANDLING RING SYSTEM

Stephen H. Green; Robert W. Hofstetter, Sr, and Robert W. Hofstetter, Jr., all of Clio, Mich., assignors to I&H Conveying & Machine Company, Clio, Mich.

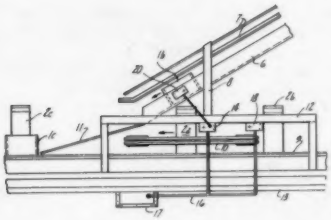
Filed Jan. 25, 1984, Ser. No. 573,629
Int. Cl.[4] B65G 37/00
U.S. Cl. 198—465.1 11 Claims

8. An apparatus for mass handling of articles in a conveying line environment comprising:

(a) a ring delivery chute adjacent to an article carrying conveyor line;

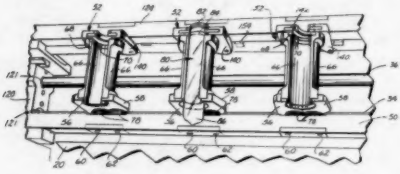
(b) means for separation of said articles on said article carrying conveyor line by automatic timing circuitry;

(c) means for sensing the presentation of said individual articles to a point adjacent to said ring delivery chute;
(d) means for releasing a single rigid cylindrical ring from said chute to encircle said article;
(e) means for discharging the combined article and cylindrical ring to an article processing station;



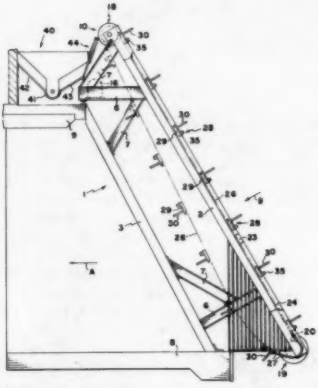
(f) means for removing said rings from said articles;
(g) means for discharging said articles from the conveyor environment; and
(h) conveyor means transporting said rings to said delivery chute for reuse.

4,709,803
PREFORM TRANSFER MECHANISM
Kevin J. Swiderski, Alto, Mich., assignor to B & G Machinery Company, Grand Rapids, Mich.
Filed Feb. 12, 1986, Ser. No. 828,970
Int. Cl.[4] B65G *47/90*
U.S. Cl. 198—468.2 **20 Claims**



1. A preform transfer mechanism for receiving preforms, transferring the preforms to a blow mold station and for removing the formed product from the mold station, said mechanism comprising:
a support frame including a guide rod;
a slide block slidably mounted on said guide rod of said support frame;
an elongated transfer bar fixed to said slide block for reciprocating movement therewith;
a plurality of jaw assemblies on said elongated transfer bar for gripping the preforms;
jaw actuating means connected to said jaw assemblies for opening and closing said jaw assemblies;
preform receiving means on said support frame for receiving preforms from an oven or the like and holding the preforms in a fixed position relative to said slide block until such are engaged by said jaw assemblies; and
drive means operatively connected to said transfer bar for reciprocating said slide block and said bar on said support frame, said preform receiving means comprising:
an elongated support bar fixedly mounted on said support frame in spaced, parallel relationship to said guide rod;
a plurality of basket sets on said support bar, each basket set including a pair of curved, partially cylindrical basket halves and arm means for pivotally supporting said halves to said support bar; and
basket actuating means operatively connected to said arm means for moving said basket halves from an open position to a closed position at which the basket halves encircle and support a preform.

4,709,804
SELF-CLEANING TRASH RACK
Terry L. Duperon, Saginaw, Mich., assignor to Duperon Corporation, Saginaw, Mich.
Filed Oct. 7, 1985, Ser. No. 785,560
Int. Cl.[4] B65G *19/00*
U.S. Cl. 198—719 **16 Claims**



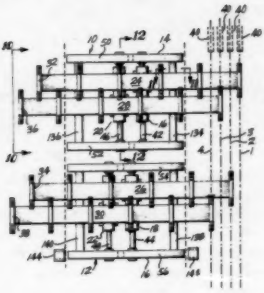
1. A self-cleaning trash rack comprising an upstanding frame inclined to the vertical; an upper turning drum rotatably mounted on said frame adjacent its upper end; a lower turning drum mounted on said frame adjacent its lower end; drive means coupled to said upper drum for rotating the latter; a plurality of endless, transversely spaced, flexible strands trained around and spanning said drums and forming substantially coplanar upwardly and downwardly movable runs, each of said strands being of such length as to provide slack in the downwardly movable run; non-slip driving means drivingly coupling each of said strands and said upper drum for driving upwardly each of said upwardly movable runs, each of said strands being in non-driving engagement with said lower drum; a plurality of trash supports secured to each of said strands at spaced apart intervals for movement with the associated strand and in such position as to engage trash; a pair of guide rails for each of said strands carried by said frame, the guide rails of each pair thereof straddling the associated strand for guiding the upwardly movable run of said strand and the trash supports secured thereto; and means carried by each of said trash supports for slideable engagement with the associated guide rails to support the upwardly movable run of the associated strand and form a fulcrum overlying said upwardly movable run and about which said trash support may rock, the non-driving engagement between said strands and said lower drum and said slack enabling a trash support on the upwardly movable run to rock about said fulcrum through an arc sufficient to permit such trash support to pass by such object in response to the imposition by an object of predetermined resistance to upward movement of such trash support.

4,709,805
DRIVE/FRAME ASSEMBLY FOR RECIPROCATING FLOOR CONVEYOR
Raymond K. Foster, P.O. Box 1, Madras, Oreg. 97741
Continuation-in-part of Ser. No. 477,767, Mar. 22, 1983. This application Dec. 11, 1984, Ser. No. 680,370
Int. Cl.[4] B65G *25/00*
U.S. Cl. 198—750 **13 Claims**

1. For use in a reciprocating floor conveyor of a type com-

prising at least four sets of floor slat members which are mounted adjacent to each other for longitudinal reciprocation, a first hydraulic drive assembly for simultaneously moving the first and third sets of floor slat members in one direction, for advancing a load, and for sequentially retracting the first and third sets of floor slat members in the opposite direction, and a second hydraulic drive assembly for simultaneously moving the second and fourth sets of floor slat members in one direction, for advancing the load, and for sequentially retracting the second and fourth sets of floor slat members in the opposite direction, said second hydraulic drive assembly being positioned endwise of the first hydraulic drive assembly, in the direction of floor slat member movement, and each said hydraulic drive assembly comprising:

a frame comprising a pair of spaced apart transverse frame members;



a pair of reversible linear hydraulic drive units, each drive unit comprising an elongated piston rod having two opposite end mounting portions, a piston portion fixed on a mid part of the piston rod, and a cylinder body mounted to reciprocate back and forth on said piston rod, said cylinder body and said piston portion together defining two variable volume chambers, one outwardly from each end of the piston portion;

means securing the opposite end mounting portions of said piston rods to mid portions of the transverse frame members;

means for connecting each cylinder body to a separate set of floor slat members; and

wherein the division of the drive units between two separate frames enables the placement of the drive assemblies in a relatively narrow space.

4,709,806

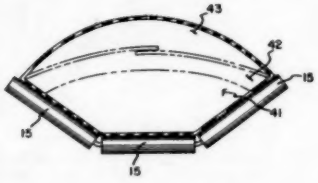
FOLDING BELT SYSTEM AND SAID BELT

Richard D. Candle, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 630,786, Jul. 13, 1984. This application May 7, 1986, Ser. No. 860,409

Int. Cl.[4] B65G *15/08*

U.S. Cl. 198—819 **11 Claims**



1. A conveying apparatus with a load carrying portion and a return portion for continuously carrying and unloading a load comprising: an endless driven conveyor belt having a tail terminal at one end and a head terminal at the other end thereof around which said belt passes, said endless conveyor belt being foldable about laterally spaced longitudinal fold axes thereby forming an integral flap laterally outward of said axes on each side of said belt, said pair of integral flaps being adapted to increase the load carrying capacity of the belt and to prevent spillage of said load by closing said integral flaps over said load on the load carrying portion of said conveying apparatus; a means for driving said endless conveyor belt; support rolls positioned at intervals between said tail terminal and said head terminal; means for loading said belt; and a means for unloading said belt, said means for unloading said belt being positioned near the head terminal, said means for loading being positioned near the tail terminal, said tail terminal having a width essentially equal to that of the belt between the laterally spaced longitudinal fold axes, said belt running substantially closed and flattened around said tail terminal with a loading chute for placing said load on said belt at a position near the tail terminal medially of the belt and interposed between said longitudinal sides of said belt to partially open said belt a limited distance as said belt moves past said chute, said belt running closed and flattened along a substantial portion of the return run portion of said belt thereby minimizing spillage along said return portion of said conveying apparatus.

4,709,807

LINK CONVEYOR WITH INSERTED RODS

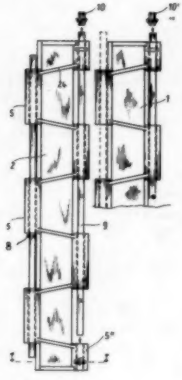
Nicolaas J. Poerink, Prins Bernardlan 25, NL-7620 AA Borne, Netherlands

Continuation of Ser. No. 549,757, Nov. 8, 1983, abandoned. This application Sep. 5, 1986, Ser. No. 904,758

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1982, 3241632

Int. Cl.[4] B65G *17/06*

U.S. Cl. 198—853 **1 Claim**



1. A conveyor belt comprising:

a plurality of link members including plural spaced-apart sleeve-like ears each of which defines an opening, said ears of one said link member being interdigitated with said ears of an adjoining said link member such that said openings of said interdigitated link members are axially aligned with one another;

rod means inserted into said aligned openings of said one and adjoining link members for coupling said one and adjoining link members to one another to permit relative articulation between said one and adjoining link members about an axis established by said rod means, said rod means having opposing terminal ends each located within a respective opening of a lateral-most one of said ears to thereby define a space within said opening between said

terminal end and an exterior side of said lateral-most one of said ears; and

plural locking means each inserted within a respective said defined space for axially locking said rod means within said aligned openings, each said locking means including a resiliently compressible peg having opposing base ends and a circumferential surface sized and configured to be accepted within said defined space, and a recessed surface radially extending from said defined space relative to said axis, wherein

said peg includes (a) means defining a locking surface resiliently compressible upon insertion into said defined space radially projecting from said circumferential surface of said peg relative to said axis for interlocking engagement with said recessed surface, the resiliency of said means defining said locking surface enabling the same to resume an uncompressed state when adjacent said recessed surface so as to provide said interlocking engagement, (b) means defining a wedge surface outwardly inclined from said circumferential surface and terminating at said locking surface for effecting wedged interengagement with said defined space, and (c) means defining an axial slit to establish a pair of resilient tongues, each said tongue including said locking surface and said wedge surface, said slit extending to a base end of said peg which is in confronting relation to a respective terminal end of said rod means, each said terminal end of said rod means defining a tapered surface, said base end of each said peg in confronting relationship to said respective terminal end defining a socket for accepting said tapered surface, said socket and terminal ends together establishing means for outwardly expanding said resilient tongues in response to axial displacement of said rod means toward said peg, wherein,

said means defining said locking surface and said wedge surfaces together lock said peg within said space, without permanently deforming the wall defining said space, which, in turn, axially locks said rod means within said aligned openings.

4,709,808

DEGRADABLE POLYMER COMPOSITION AND ARTICLES PREPARED FROM SAME

Dennis C. Balduff, Toledo, and Saleh A. Jabarin, Holland, both of Ohio, assignors to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 856,638, Apr. 25, 1986, abandoned, which is a continuation of Ser. No. 726,487, Apr. 24, 1985, abandoned, which is a continuation of Ser. No. 524,279, Aug. 18, 1983, abandoned. This application Oct. 17, 1986, Ser. No. 920,296

Int. Cl.[4] **C08J** *3/20*; **B65D** *71/00*; **C08L** *23/06, 23/12*

U.S. Cl. 206—158 **19 Claims**

1. A degradable polymer composition comprising:

(a) an ethylene-carbon monoxide copolymer only in an amount sufficient to provide a total of substantially about 0.01 to 0.025 percent by weight of CO in the composition; and

(b) a high density polyethylene constituting substantially the rest of the composition.

2. A degradable polymer composition comprising:

(a) an ethylene-carbon monoxide copolymer only in an amount sufficient to provide a total of substantially about 0.05 to 0.25 weight percent CO in the composition; and

(b) a linear low density polyethylene constituting substantially the rest of the composition whereby the composition degrades in about two months or more as signified by an elongation of about 200% or less.

4. A degradable polymer composition comprising:

(a) an ethylene-carbon monoxide copolymer only in an amount sufficient to provide a total of substantially about 0.05 to 0.1 weight percent CO in the composition; and

(b) polypropylene constituting substantially the balance of the composition whereby the composition degrades in about two months or more as signified by an elongation of about 200% or less.

4,709,809

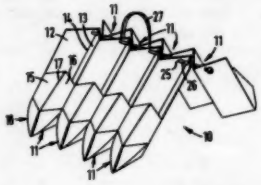
BOTTLE CARRIER

Alan C. South, Willingham, England, assignor to R. W. Simon Limited, Devon, England

Filed Aug. 22, 1986, Ser. No. 899,159

Int. Cl.[4] **B65D** *5/36, 5/64, 33/06, 30/22*

U.S. Cl. 206—162 **9 Claims**



1. A carrier (**10**) for a bottle comprising a container (**11**) having opposite facing side walls (**12,13,15,16**) and a base portion (**18**) united with the side walls (**12,13,15,16**), the base portion (**18**) having downwardly converging walls (**23**) arranged such that, when a bottle is received in the container (**11**), weight of the bottle causes the walls (**23**) of the base portion (**18**) to diverge one from another and the side walls (**12,13,15,16**) to converge towards the bottle, there being a plurality of containers (**11**) each suspended from an elongate member (**26**) extending adjacent upper portions of the side walls (**12,13**).

4,709,810

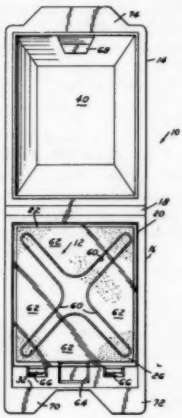
CONTAINER FOR AN ELECTROPHORETIC SUPPORT MEDIUM

David G. Mayes, Beaumont, Tex., assignor to Helena Laboratories Corporation, Beaumont, Tex.

Filed Nov. 14, 1986, Ser. No. 930,620

Int. Cl.[4] **G01N** *27/28*

U.S. Cl. 206—205 **18 Claims**



1. A container for protecting and enclosing an electrophoretic support medium having a base sheet with at least two opposed major surfaces and a layer of an electrophoretic gel adhered to one of the major surfaces of the base sheet, comprising:

a top portion and a bottom portion which when closed being sealingly engageable with one another;

said bottom portion having a recess therein for accommodating the support medium, at least a portion of said recess having a substantially smooth planar surface; and

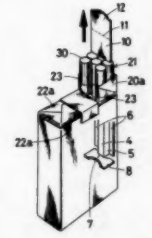
a liquid being disposed between the planar surface of said bottom portion and the other surface of said base sheet, said liquid being in surface contact with the other surface of said base sheet and the planar surface of said recess, whereby the support medium may be retained in said recess as a result of the contact adhesion between the other surface of said base sheet and said liquid, and as a result of the contact adhesion between the planar surface of said recess and said liquid.

4,709,811

DEVICE FOR OPENING SEAL OF CIGARET PACKAGE AND PULLING OUT CIGARETS FROM THE PACKAGE

Katsuyuki Shimada, Takarazuka, Japan, assignor to Kinki Insatsu Kabushiki Kaisha, Osaka, Japan

Filed Aug. 26, 1986, Ser. No. 900,632
Claims priority, application Japan, Sep. 3, 1985, 60-134907[U]
Int. Cl.[4] B65D *85/10, 5/54, 17/34*
U.S. Cl. 206—254 **12 Claims**



1. A device for opening the seal of and for pulling out cigarets from a cigaret package of the type enclosed by a folded packaging sheet having score line on the top thereof, the device comprising:

an inserting piece having upper and lower ends;

a cigaret base end contacting piece for contacting the bases of cigarets and integrally connected at the upper end of said inserting piece;

a package seal opening and cigaret removing tongue piece integrally connected to said cigaret base end contacting piece;

a cigaret end supporting peice integrally connected to the lower end of said inserting piece;

said inserting peice having a central piece substantially at a central portion thereof;

a pair of said peices, each one of said pair of blade pieces integrally conected to a respective side of said central piece;

a pair of blade pieces, each one of said pair of blade pieces integrally connected to a respective side of said central piece;

said cigaret end supporting piece being substantially centrally connected to said central piece, said cigaret end supporting piece being necked at the connection to said central piece, said cigaret end supporting piece being substantially horizontally disposed in the cigaret package when said inserting piece is substantially vertically disposed in the cigaret package;

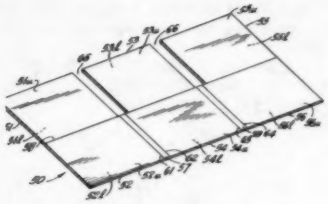
said central piece, said pair of side peices, and said pair of blade peices substantially extending the width of the cigaret package, whereby said cigaret end supporting piece supports an odd number of cigarets greater than or equal to five, whereby the pair of side pieces and the pair of blade pieces support and urge the central piece centrally of the package, thereby ensuring that the central piece remains centrally located and assures positive pulling out of the at least five cigarets from the package.

4,709,812

COMPACT DISC PACKAGE AND A METHOD OF MAKING SAME

Donald W. Kosterka, Chicago, Ill., assignor to AGI Incorporated, New York, N.Y.

Filed Jul. 11, 1986, Ser. No. 884,730
Int. Cl.[4] B65D *85/67*
U.S. Cl. 206—310 **22 Claims**



1. A package for a compact disc comprising:

a rectangular sheet divided into two rows of three rectangular sections, the rows being separated by a fold line, the three sections in the first row being separated from each other by strips having a width small relative to the width of the sections, the strips being bounded by fold lines, the three sections in the second row being separated from each other by slots having a width slightly greater than the width of the strips, the second row being folded along the fold line so that each of the sections of the second row partially overlies a section of the first row but does not overlie any strip adjacent that section of the first row, the overlying sections being joined together to form segments;

at least one compact disc holder adhered to the segment at a first end of the sheet;

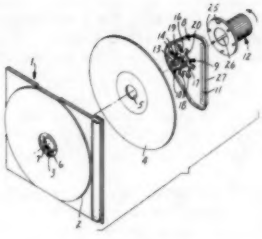
the width of the sections in the first row, of the strips and of the slots being predetermined so that when the segment to which the holder has been adhered is folded along the fold lines bordering the strip at its edge and the segment at the second end of the sheet is folded along the fold lines bordering the strip at its edge, the three segments abut each other.

4,709,813

ANTI-THEFT DEVICE FOR COMPACT DISCS

Theodor N. Wildt, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 10, 1986, Ser. No. 850,161
Int. Cl.[4] B65D *85/57*
U.S. Cl. 206—312 **16 Claims**



1. An anti-theft device for restricting unauthorized removal of an article, such as a recording medium, a compact digital

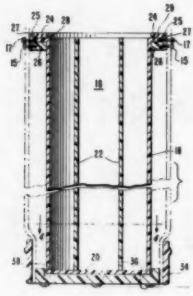
audio disc or the like, from a cartridge having a mounting stud engaging a central opening in the article when said article is in position in the cartridge, said device comprising a perforate plate having a plurality of holes extending therethrough, means for locking the plate to the mounting stud of said cartridge when said article is in position between said perforate plate and cartridge, and unlocking means having thereon pins for engaging said through-holes in the perforate plate from the side thereof opposite the article to actuate said locking means for releasing the plate and article from the mounting stud.

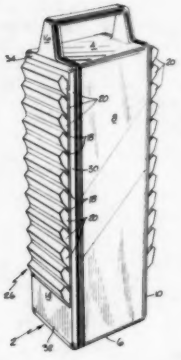
4,709,814

ROTATABLE CLUB HOLDER INSERT FOR A GOLF BAG

Anthony J. Antonious, 205 East Joppa Rd., Unit 1603, Towson, Md. 21204

Filed Dec. 17, 1986, Ser. No. 942,675
Int. Cl.[4] A63B *55/00*
U.S. Cl. 206—315.3 **39 Claims**





1. A golf bag for receiving and carrying a plurality of golf clubs, the golf bag comprising:

an elongated outer shell;

an elongated insert for receiving and holding a plurality of golf clubs, said insert being positioned within said outer shell; and

connector means for interconnecting said insert with said outer shell in a manner which permits said insert to rotate about its longitudinal axis relative to said outer shell, whereby the user of the golf bag can selectively rotate the insert so that he can easily withdraw a club from or place a club into said insert, said connector means including an annular support member included on said outer shell and an annular mounting flange included on said insert, said mounting flange cooperating with and being rotatably supported on said support member.

4,709,815

TAPE CARTRIDGE HOLDING CASE

Macy J. Price; Macy J. Price, Jr., both of Golden, and Mack E. Johnson, Littleton, all of Colo., assignors to Engineered Data Products, Inc., Broomfield, Colo.

Filed Aug. 25, 1986, Ser. No. 899,731
Int. Cl.[4] A47B *81/00*
U.S. Cl. 206—387 **6 Claims**

1. A tape cartridge holding case for use in moving tape cartridges into and out of a storage system and for transporting tape cartridges from one location to another location comprising:

an elongated member having a generally rectangular transverse cross-sectional configuration;

said elongated member having at least a top wall portion, a bottom wall portion and four side wall portions all of which are integral;

a first side wall portion having an inner surface;

a second side wall portion having an inner surface facing said inner surface of said first side wall portion;

a plurality of spaced apart ledges extending inwardly from said inner surfaces of said first side wall portion and said second side wall portion for a fixed distance and terminating in an edge;

a third side wall portion extending between said first and second side wall portions;

a fourth side wall portion extending between said first and second side wall portions;

means defining only one opening in said third side wall portion facing in one direction and means defining only one opening in said fourth side wall portion facing in a direction opposite to said one direction;

said ledges cooperating with said openings to form a plurality of shelf means so that tape cartridges may be inserted through each of said openings and be supported by opposite ledges of said first and second side wall portions;

stop means comprising central rib means integral with said first and second side wall portions, said top wall portion and said bottom wall portion and extending inwardly therefrom;

each of said ledges extending between said central rib means and said means defining said opening in said third and fourth side wall portions to form back to back compartments; and

each of said ledges forming an acute angle with said central rib means with said acute angle facing said top wall portion.

4,709,816

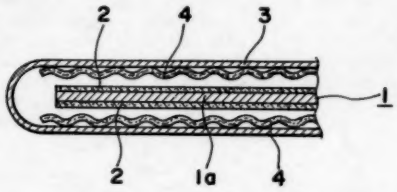
RECORDING DISC CARTRIDGE

Fujio Matsumoto, Ibaraki; Hajime Doi, Ibaraki; Kunio Mizushima, Ibaraki; Masaya Funahashi, Osaka; Tomizo Taniguchi, Kyoto, and Shoichi Sakamoto, Ibaraki, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Mar. 11, 1986, Ser. No. 838,474
Claims priority, application Japan, Mar. 14, 1985, 60-49436; Apr. 30, 1985, 60-94084
Int. Cl.[4] G11B *5/70;* **B65D** *85/57*
U.S. Cl. 206—444 **8 Claims**

1. A recording disc cartridge comprising a recording disc containing, at least in its surface layer, a lubricant comprising at least one compound selected from the group consisting of an

aliphatic acid, its salt, ester and amide, a case in which the recording disc is rotatively contained, and a liner comprising at



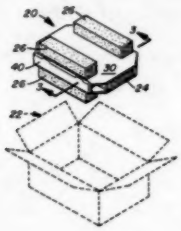
least 30% by weight polyester fiber which is interposed between the case and the recording disc, facing the disc.

4,709,817

CONTAINER AND PROTECTIVE INSERT FOR SHOCK SENSITIVE DEVICES

Peter Keady, Menlo Park, and Thomas P. Magennis, Fremont, both of Calif., assignors to Viking Container Company, San Jose, Calif.

Filed Feb. 10, 1986, Ser. No. 827,631
Int. Cl.[4] B65D *85/30, 5/50*
U.S. Cl. 206—523 **6 Claims**



6. A blank for forming a shock-resistant unit for protecting from shock an article and for insertion, with said article inside said unit, into a shipping carton, including in combination:

a base sheet having end and side edges and a series of first, parallel score lines, parallel to said end edges, enabling folding and defining a base area between two of said score lines, a narrow connecting area between a pair of score lines, and a cover area between a pair of score lines, said narrow area lying between and immediately ajoining said base and cover areas, said base sheet having an upper surface and a lower surface,

a first group of shock-resistant blocks secured to said upper surface in said second area and defining an article-receiving space, the thickness of said blocks being approximately equal to the width of said third area, to enable folding of said sheet so that said cover area can overlie and engage the upper surfaces of said blocks,

a second group of shock-resistant blocks secured to said lower surface of said sheet in said base area and aligned with said article-receiving space, and

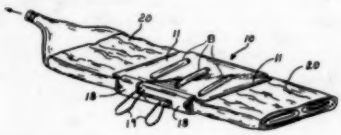
a third group of shock-resistant blocks secured to said lower surface in said cover area and comprising a second pair of blocks and aligned so that when said cover area is folded over said first group of blocks, said third group of blocks are aligned with said article-receiving space.

4,709,818

APPARATUS AND METHOD FOR COMPRESSION PACKAGING A COMPRESSIBLE ARTICLE INTO A CONTAINER AND A CONTAINER THEREFOR

Dominic J. Spinosa, Wantagh, and Frank Knoll, Huntington Station, both of N.Y., assignors to East/West Industries, Inc., Hauppauge, N.Y.

Filed Aug. 20, 1985, Ser. No. 767,412
Int. Cl.[4] B64D *17/50*
U.S. Cl. 206—524.8 **13 Claims**



1. A container for compression packaging of a compressible article comprising:

two rigid planar rectangular sides each connected to the other at a first end for establishing a spaced-apart, parallel, and substantially coextensive relationship between said sides,

closure means at the other end of each said side for releasably holding said sides in said established relationship against the force of said compressed article held therebetween, and

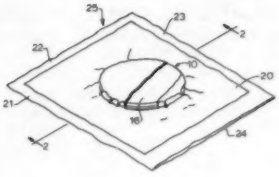
two retaining means arranged on said sides opposite each other and extending between said ends, said retaining means having an open condition and a closed condition, said open condition permitting compression packaging of said compressible article through said retaining means and said closed condition retaining said compressible article under pressure, whereby said compressible article is packaged in said container under pressure and retained therein until released by said closure means.

4,709,819

METHOD FOR PRESERVING PLATED MEDIA AND PRODUCT

Charles P. Lattuada, Burlington, and Frank R. Gladden, Jr., Mebane, both of N.C., assignors to Environmental Diagnostics, Inc., Burlington, N.C.

Filed Jul. 23, 1986, Ser. No. 888,521
Int. Cl.[4] B65D *85/00;* **B65B** *55/04*
U.S. Cl. 206—524.8 **4 Claims**



1. A vacuum packaging process for preserving a medium in the nature of biological media or gel such that the media or gel can be preserved without dehydration or deterioration and without refrigeration at ambient temperature for a prolonged time period substantially in excess of six months, said process comprising the steps;

(a) storing the medium to be preserved in a sterile, optically clear, plastic container formed as a petri like dish with a loose fitting cover to permit air flow between the cover and dish and of sufficient strength to withstand without breakage the vacuum pressures of the process;

(b) preparing a preformed rectangular pouch having air,

liquid, and light impervious heat sealble flexible walls with three sides sealed and one end open to receive said container and treating the interior of the pouch with a bactericidal aerosol agent admitted through said open end to sterilize the interior space and to leave interior surfaces of the pouch coated with the agent prior to receiving said container containing said medium, said agent being selected to have no deleterious effect on the said media or gel;

(c) aseptically inserting said container into the pouch through said open end with the said open end remaining open and with said container placed so as to permit subsequent heat sealing of said open end;

(d) placing said sterilized pouch containing said container containing said medium in a vacuum chamber having means for confining a gas introduced and retaining a reduction in pressure established therein and other means within said chamber for heat sealing said open end while maintaining a vacuum in said chamber;

(e) sealing said chamber to provide a gas tight enclosure and reducing the pressure therein to a first level below the external atmospheric pressure;

(f) during the presence of such reduced pressure at said first level, admitting to said chamber a gas having the characteristic of being inert to said medium;

(g) allowing said inert gas to flow through said pouch open end into said container;

(h) flowing said inert gas from said chamber to remove sufficient oxygen to stop oxidation activity in said biological media or gel and to remove excess said inert gas from said container interior, from said pouch and from space within the chamber surrounding said pouch;

(i) equalizing the pressure within said pouch and within said chamber surrounding said pouch to a second level below atmospheric pressure;

(j) heat sealing said pouch open end within said chamber during the presence of said second level of pressure; and

(k) relieving said reduced pressure in said chamber to bring the chamber pressure to the level of atmospheric pressure and allowing said pouch walls to collapse around said container and bring the interior surfaces of said pouch sterilized and coated by said agent into intimate contact with the exterior surfaces of said container.

3. A packaged medium product made by the process of claim 1 and storble without refrigeration at ambient temperature for a prolonged time period substantially in excess of six months without dehydration or deterioration of said media or gel.

4,709,820

SHEET DISPENSING APPARATUS

Stuart M. Jenkins, Sussex; Michael S. Spencer, Portsmouth, both of England, and Ross Mayfield, Torrance, Calif., assignors to De La Rue Systems Limited, London, England

Filed Mar. 12, 1985, Ser. No. 710,964

Claims priority, application United Kingdom, Mar. 12, 1984, 8406374

Int. Cl.[4] B07C *5/36*; B65H *7/00*

U.S. Cl. 209—534 **6 Claims**

1. Sheet dispensing apparatus comprising:

a dispense outlet;

a dump;

a first diverter;

a second diverter;

a first conveying means for dispensing sheets along a feed path defined by said first conveying means to said first diverter;

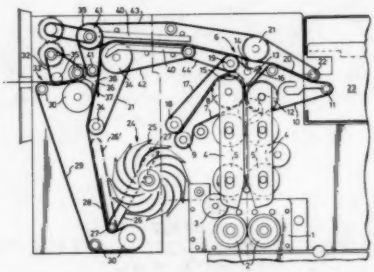
second conveying means for conveying sheets from said first diverter to a stacking position;

stacking means downstream of said first diverter at said stacking position for stacking sheets;

reject conveying means for conveying sheets from said first diverter along a first reject path to said dump and for conveying stacked sheets from said second diverter along a second reject path to said dump;

detection means for detecting unsuitable sheets in accordance with predetermined criteria;

said first diverter including a movable guide cooperating with said first, second, and reject conveying means whereby in a first position said first diverter guides sheets from said feed path to said second conveying means, said first diverter being movable in response to an output sginal from said detection means to a second position in which



detected unsuitable sheets are diverted along said reject conveying means via said first reject path to said dump;

third conveying means for selectively delivering said stacked sheets to said second diverter,

said second diverter downstream of said stacking means being selectively movable to cause said third conveying means to convey said stacked sheets either to said dispense outlet or to said reject conveying means which conveys said stacked sheets along a second reject path, a portion of which includes at least a portion of said first reject path, to said dump.

4,709,821

CONTAINER SHAPED IN SUCH MANNER AS TO BE UNOVERTURNABLE FOR RECEIVING A LIQUID

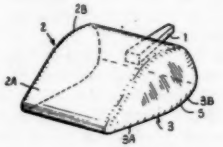
Michel Guiffray, 136, rue Vulfran Warmé , 80000 Amiens, France

Filed Nov. 25, 1986, Ser. No. 934,876

Claims priority, application France, Nov. 26, 1985, 85 17456

Int. Cl.[4] B65D *23/00*

U.S. Cl. 215—1 R **14 Claims**



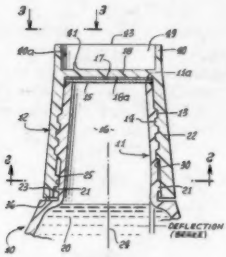
1. A container adapted to receive a liquid comprising a neck, an opening in the neck for expelling the liquid, two sides each comprising a planar bearing portion and a rounded portion connected to the planar portion and to the neck, the two planar portions forming a dihedron, and rounded lateral portions interconnecting said two bearing portions.

4,709,822

BOTTLE CAP WITH SEAL CUTTER IN TOP RECESS

Marcel Vataru, Los Angeles, Calif., assignor to Wynn Oil Company, Fullerton, Calif.

Filed Aug. 11, 1986, Ser. No. 895,205
Int. Cl.[4] B65D *41/50*
U.S. Cl. 215—216 7 Claims



1. In a child resistant upright botle neck and cap combination, the neck having threads formed on its outer side and there being means at the uppermost end of the neck to close same, the cap having a first skirt and threading formed on the skirt at the inner side thereof to mesh with the neck threads when the cap is rotatably attached to the neck, the improvement comprising

(a) first lug means including a first lug on the neck and protruding sidewardly outwardly thereof,

(b) and a second lug on the cap skirt and protruding sidewardly inwardly thereof to engage and ride over said first lug during said rotatable attachment of the cap to the neck,

(c) and a brake surface formed on the cap generally opposite said second lug and presented inwardly to engage the neck and frictionally resist cap rotation in either direction after the second lug rides over the first lug in a cap tightening direction,

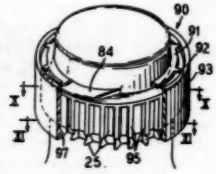
(d) the cap having an inner wall surface including a surface portion that defines said brake surface, said surface portion protruding inwardly toward a central axis defined by the cap, said surface portion smoothly merging with said inner wall surface and extending uninterruptedly over an arc of at least about 25° as measured about said central axis defined by the cap.

4,709,823

TAMPER EVIDENT BOTTLE OR PACKAGE CLOSURE

James M. Beck, 290 Iowa Ct., Carol Stream, Ill. 60188, and Robert D. Rohr, Elgin, Ill., assignors to James M. Beck

Filed Feb. 5, 1987, Ser. No. 11,111
Int. Cl.[4] B65D *41/32*
U.S. Cl. 215—235 14 Claims



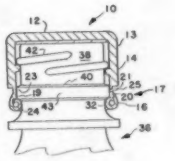
1. A tamper resistant container closure assembly comprising a container having an orifice associated with a container neck, a closure cap for said orifice having top portions, means carried by the container and by the closure cap for affixing the closure cap to the container closing said orifice, an overcap receivable over said closure cap, said overcap having a peripheral skirt for surrounding a peripheral portion of said closure cap and of said container neck, anti-rotation means carried by said skirt and by said container interacting to resist rotation of said skirt with respect to said container in at least one rotational direction, abutable, opposed surfaces on said closure cap and said overcap resisting removal of said skirt in a direction away from said container, said overcap having end portions thereof overlying top portions of said closure cap, said end portions effective to prevent said closure cap from being acted upon to open said orifice, said end portions being connected to said skirt through frangeable connections whereby said end portions may be broken away from said skirt to allow said closure cap to be acted upon to open said orifice.

4,709,824

TAMPER EVIDENT PLASTIC CAPS WITH LOWER SEPARABLE OR BREAKAWAY PORTIONS AND A METHOD OF FORMING THEM

Mortimer S. Thompson, Arlington, Mass., assignor to Tri-Tech Systems International Inc., Maumee, Ohio

Filed Dec. 12, 1985, Ser. No. 809,057
Int. Cl.[4] B65D *41/34*
U.S. Cl. 215—252 41 Claims



23. A tamper evident cap for a container, comprising:

a top wall, and

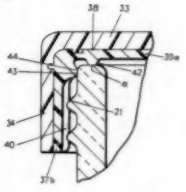
a plastic skirt depending from said top wall including a line of weakness therein, and a lower resilient free end which is curved away from said skirt into a resilient curled free end of plastic forming an arc of at least 50 degrees which is prestressed for enhancing the engaging and interferring functions of said curled free end, and wherein said prestressed curled free end reduces the breadth of said skirt prior to capping and is adapted upon capping to provide an interference with a container so that upon initial removal of the cap from the container the line of weakness separates to indicate the condition of the container.

4,709,825

PRESS-ON TWIST-OFF CLOSURE FOR CONTAINER

George V. Mumford, Ventura, Calif., assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Sep. 15, 1982, Ser. No. 418,366
Int. Cl.[4] B65D *41/16*
U.S. Cl. 215—318 16 Claims



1. A closure for a container, the container comprising a neck finish area with tenerally helical threads, the closure comprising a cap having a top and a peripheral skirt of a hard, flexible

thermoplastic material, a gasket member of resilient plastic located next to the shell of the cap, the gasket member including a skirt located just inside and concentric with the shell skirt, there being a plurality of ribs in the gasket material on the inside thereof for deformation around the threads of the container when the cap is closed over the threads, the area of the ribs being less than about 10% of the circumferential area of the gasket on the skirt, there being sufficient ribs spaced apart to adequately retain the cap on the container when subject to abuses from shipping and handling, the plastic gasket material and plastic cap shell being held together by vertical interlocking spline means on the cap skirt and the gasket skirt, the spline means being so constructed and arranged that the gasket member will not rotate with respect to the shell when the closure is twisted off the container, the spline means including a plurality of spaced apart vertical splines and vertical corresponding cooperating grooves.

4,709,826

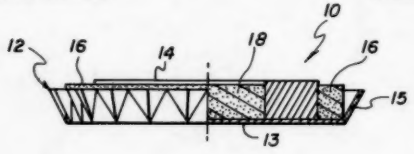
APPARATUS FOR THE RETENTION OF FLUID FLOWING FROM A CONTAINER

Mon N. Wong, 4132 Konya Dr., Torrance, Calif. 90503

Continuation of Ser. No. 811,766, Dec. 20, 1985, abandoned. This application Mar. 9, 1987, Ser. No. 20,219

Int. Cl.[4] B65D *1/34, 25/20*

U.S. Cl. 220—1 C **3 Claims**



1. An apparatus for retention of fluid flowing from a container mounted on a vehicle comprising:

an open-ended shallow pan having a center;

a single unitary substantially annular magnet mounted near the center of said pan and attaching said pan to said vehicle;

a first annular absorbent disposed in said pan within said magnet; and

a second annular absorbent disposed in said pan and peripherally disposed immediately adjacent to and about said magnet.

4,709,827

HOME CONTAINER

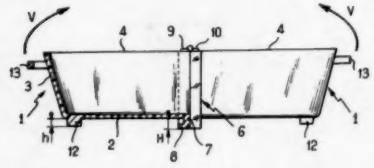
Jeannine Jaillet, and Georges Jaillet, both of 19 boulevard de Bercy, 75012 Paris, France

Filed Dec. 30, 1986, Ser. No. 947,809

Claims priority, application France, Jan. 15, 1986, 86 00495

Int. Cl.[4] B65D *6/12*

U.S. Cl. 220—4 A **9 Claims**



1. A home container comprising two container elements each comprising a bottom and a side wall extending around a portion of the bottom and extending upto first and second ends on either side of a bottom division edge which does not include a side wall, hinged connection means interconnecting the two container elements about a hinge axis adjacent to a top edges of the ends of the side wall on either side of the bottom division edge, and retaining means for holding the bottom division edges of the associated container elements against each other, the container including bag-fastening means adjacent to the ends of the side walls of the container elements.

4,709,828

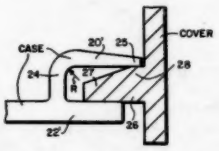
TWO-PART TRANSFORMER CASTING HAVING LIQUID-TIGHT SEAL

Frank J. Zoladz, Morristown, Tenn., assignor to North American Philips Consumer Electronics Corp., Knoxville, Tenn.

Continuation of Ser. No. 746,488, Jun. 19, 1985. This application Mar. 18, 1986, Ser. No. 842,055

Int. Cl.[4] B65D *6/34*

U.S. Cl. 220—76 **9 Claims**



1. A transformer casing oomprising:

a first part having a rigid first member, and a flexible member extending in a direction substantially parallel to said rigid first member at a predetermined distance therefrom and connected to said rigid first member at a first extremity thereof, said rigid first member and said flexible member together forming a channel;

a second part having a rigid projecting member adapted to be inserted into said channel, said rigid projecting member having a first portion clearing said flexible member and having a wedge-shaped cross section, said projecting member further having a first surface for contacting said rigid first member to form a liquid-tight seal; and

wherein said first part of said casing and said second part of said casing together constitute a housing containing hot potting compound.

4,709,829

SAN-I-CAN (A BEVERAGE CONTAINER INCORPORATING ITS OWN STRAW)

Lee R Johnson, and Lee K. Johnson, both of P.O. Box 415, Avon, Mont. 59713

Filed Sep. 2, 1986, Ser. No. 902,949

Int. Cl.[4] A47G *19/22*

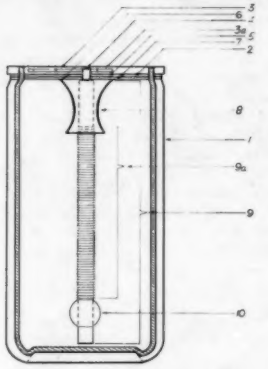
U.S. Cl. 220—90.2 **1 Claim**

1. A straw assembly device adapted for suitably optimal beverage consumption within a liquid container of the type having a top surface wall with a pull-tab closure over an opening therein, a hollow shaped containing body, and a bottom surface wall, said assembly device comprising in combination:

(a) a flexible, extendible corrugated drinking drinking straw with a buoyant air chamber mounted near its bottom portion,

(b) means for allowing variable positioning of said straw within the confines of said beverage container consisting of an orifice, attached to or integrally a part of the underside of said top surface wall of said beverage container in alignment with said opening, comprising a sufficiently constructed shape to slidably receive a straw said orifice being wider at its top, narrow near its midpoint, and belling near its bottom, while possessing a circular cross-sectional diameter at any given longitudinal point that a plane may be passed perpendicular to its vertical axis whereby

said straw, once said beverage container has been opened and said straw manually extended, may be axially moved toward any convenient locality within the confines of said beverage container,



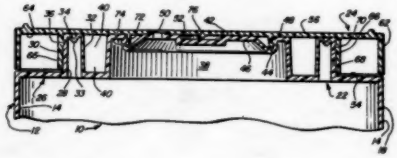
(c) means to consume the optimal amount of liquid within said beverage container comprising said axial movement of said manually extended straw slidably received by said orifice while said beverage container is in open position whereby said straw may be so placed to consume the utmost amount of liquid within said beverage container.

4,709,830

CLOSURE WITH TOP CUT TAMPER EVIDENT FEATURE FOR WIDE MOUTH CONTAINER

Walter J. Kreiseder, Barrington, Ill., assignor to Courtesy Mold & Tool Corporation, Wheeling, Ill.

Filed Apr. 16, 1987, Ser. No. 39,151
Int. Cl.[4] B65D *51/22*
U.S. Cl. 220—258 **14 Claims**



1. A closure for a container having a body with a top end, the closure comprising:

a stationary endcap integrally joined to and integrally closing said top end, said endcap and top end being joined by a raised annular rib, said rib having a weakened portion;

an overcap attached to and covering said endcap and being coaxially rotatable thereabout; and

a knife blade secured to and depending from said overcap and arranged to engage and circumscribe said weakened portion as said overcap is rotated about said endcap to sever said endcap from said container.

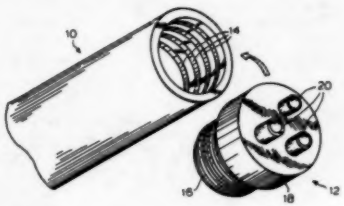
4,709,831

THREADED END ENCLOSURE

Myron J. Coplan, Natick, Mass., assignor to Albany International Corporation, Menands, N.Y.

Continuation-in-part of Ser. No. 807,256, Dec. 10, 1985, abandoned. This application Feb. 18, 1986, Ser. No. 830,622
Int. Cl.[4] B65D *53/00*
U.S. Cl. 220—304 **5 Claims**

1. A pressure shell for housing a membrane separatory system, the pressure shell comprising a hollow body which is generally cylindrical in shape and has threads on at least one end thereof: a first threaded end plug adapted to engage the threaded interior of the hollow body, and at least one aperture in the first end plug for allowing fluid communication between



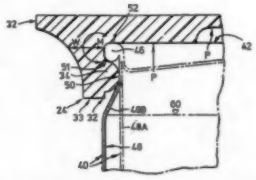
the interior of the pressure shell and the outside environment and comprising a second threaded end plug and wherein the hollow body is threaded at both ends and wherein said hollow body has an external diameter in the area of the threads which is greater than its external diameter elsewhere.

4,709,832

FLEXIBLE CLOSURE FOR RESEALING CONTAINERS

Jim Mantyla, 12 Westhill Road, Guelph, Ontario, N1H 7T6, Canada

Filed Jul. 7, 1986, Ser. No. 882,559
Claims priority, application Canada, Nov. 12, 1985, 494996
Int. Cl.[4] B65D *41/16, 41/18*
U.S. Cl. 220—306 **12 Claims**



1. A flexible closure for sealing a container of carbonated fluid having a circular top, said circular top having an opening, a vertically extending rim, and a sidewall extending below said vertically extending rim, said flexible closure comprising:

a top portion deflectable away from said circular top in response to pressure from carbon dioxide gas escaping from said carbonated fluid through said openir.g; and

a rigid sealing skirt extending from said top portion for receiving said circular top in sealing relationship and for sealing against said vertically extending rim and said sidewall;

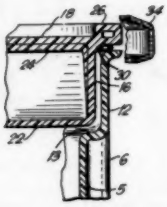
said sealing skirt being rigidly attached to said top portion to render the top portion and the sealing skirt substantially immovable relative to one another, the closure being sufficiently flexible to enable rotation of said sealing skirt towards said sidewall in response to deflection of said top portion outwardly, and for rotation of said sealing skirt away from said sidewall in response to deflection of said top portion inmwardly.

4,709,833

ROTATIONALLY MOLDED SALVAGE DRUM AND RECESSED LID

William J. Granberg, Mansfield; Richard A. Wagner, and Gary W. Hundt, both of Fort Worth, all of Tex., assignors to Essex Environmental Industries, Inc., Hurst, Tex.

Filed Feb. 20, 1987, Ser. No. 17,068
Int. Cl.[4] B65D *45/32*
U.S. Cl. 220—319 **18 Claims**



1. In a rotationally molded polyethylene salvage drum having generally cylindrical sidewall and a lid, the improvement which comprises:

a plurality of spaced apart vertical column ribs radially disposed from said sidewall,

an outwardly projecting rim at the open end of the drum, and

a double walled recessed lid with a circumferential reinforcing bead,

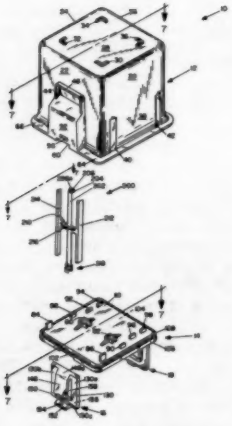
wherein said reinforcing bead and said projecting rim are adapted to be secured by a ring clamp to seal the drum.

4,709,834

STORAGE BOX

Roger Mortensen, and Barry Gregerson, both of Excelsior, Minn., assignors to Empak Inc., Chanhassen, Minn.

Filed Feb. 2, 1987, Ser. No. 9,899
Int. Cl.[4] B65D *45/16*
U.S. Cl. 220—326 **4 Claims**



1. Storage box for a wafer processing cassette comprising:

a. box including four sides and a top, outboard robotic handle mend positioned on opposing sides, outboard spring clip retaining means positioned on opposing sides and adjacent said box opening a perimeter flange extending substantially about said four sides, and means for supporting a box door within said box;

b. box door including a plurality of geometrically spaced upwardly extending means for locating said wafer processing cassette on end on an upper side of said door and two opposing detents on a lower side of said door;

c. spring clip means including a locking retainer for engaging in said clip retaining means and a spring latch for engaging against said detents, said locking retainer means and said spring latch on opposing ends of geometrically configured member; and,

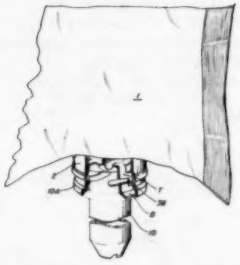
d. wafer retainer means including a spring bar, a cross member positioned perpendicularly to said spring bar, opposed parallel vertically aligned contact bars positioned vertically and perpendicularly to the plane of said cross member, a link and wedge shaped member attached to said bottom of said spring bar whereby said spring biased wafer retainer positions against wafers in said processing cassette.

4,709,835

DISPENSER POUCH FOR BEVERAGE SYRUPS AND CONCENTRATES

Manfred Krüger, Berlin, Fed. Rep. of Germany, and Lawrence S. Mucha, Mableton, Ga., assignors to Coca-Cola Company, Atlanta, Ga. and Bosch-Siemens Hausgerate GmbH, Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 711,364, Mar. 13, 1985, Pat. No. 4,667,853. This application Nov. 13, 1985, Ser. No. 797,661
Int. Cl.[4] B67B *7/24*; B65D *35/00*
U.S. Cl. 222—87 **9 Claims**



1. A non-reusable disposable syrup package system wherein contents of a non-reusable disposable syrup package can be dispensed in controlled volumes comprising:

a dispensing nozzle with valve means for controlling and delivering a predetermined quantity of the contents of the syrup package;

a collapsible bag having a discharge opening therein;

a discharge spout secured to said discharge opening;

a metering element disposed within said spout and having a fluid passage therethrough;

mounting means substantially permanently attached to said spout of the syrup package;

web means for releasably connecting said metering element to said mounting means, said web means including preset breaking points;

connecting means for releasably coupling said metering element to said dispensing nozzle upon connecting said dispensing nozzle to the syrup package,

said breaking points of said web means being broken, detaching said metering element from said mounting means, after said connecting means is releasably coupled to said metering element upon connecting said dispensing nozzle to the syrup package,

said metering element being released from said connecting means of said dispensing nozzle and substantially retained within the syrup package upon removing said dispensing

nozzle from the syrup package, thereby preventing the reuse of the syrup package as a controlled volume dispensing device.

4,709,836

FLUID FLOW NOZZLE

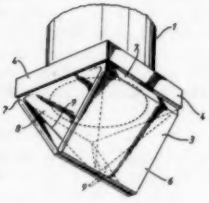
Arve Andersen, Krokstadelva, Norway, assignor to Elopak A/S, Norway

Filed Apr. 16, 1986, Ser. No. 852,533

Claims priority, application United Kingdom, Apr. 16, 1985, 8509712

Int. Cl.[4] B65D *5/72*

U.S. Cl. 222—490 **10 Claims**



1. A fluid flow nozzle having an inlet end region and outlet end region and comprising:

first and second relatively rigid flaps arranged facing each other at respective first and second opposite sides of the nozzle;

first and second relatively flexible walls arranged between the flaps and facing each other at respective third and fourth opposite sides of the nozzle and each having opposite edge zones thereof attached to respective edge zones of the respective flaps so as to form with the flaps a loop encircling the nozzle interior;

a ring at said inlet end region and peripherally co-extensive with said loop and mounting said loop;

said first flap being so mounted upon said ring as to turn relative to said second flap, about an axis of turning transverse to a longitudinal axis of the nozzle and substantially parallel to respective linear outer edges of the flaps, between an open position and a closed position in which closed position said outer edges come together along a linear zone at the base of an interior space bounded by said flaps and converging towards said linear zone and the walls close off said interior space at said third and fourth sides and each wall extends from said respective edge zone of the respective flap toward said longitudinal axis; and

said first flap being biassed into the closed position against the action of any fluid supplied under pressure to the nozzle.

4,709,837

FILTER ASSEMBLY FOR DRY POWDER FILLING MACHINE

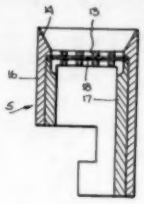
George R. Erdman, Harrisonburg, Va., assignor to Merck & Co., Inc., Rahway, N.J.

Filed May 1, 1984, Ser. No. 605,745

Int. Cl.[4] A01N *17/08*

U.S. Cl. 222—636 **1 Claim**

1. In a dry powder filling machine using a rotary wheel filling mechanism having at least one radially disposed volume adjustable cylindrical filling cavity comprising an outer shell, an inner shell and a small mesh circular screen, said outer shell consisting of a cylinder open at one end and an integrally formed recessed end plate having regularly spaced small perforations at the other end, said other end of the outer shell cylinder having an anmular sloping inner wall surface that slopes inwardly from an outer edge of the other end to an inner edge of the sloping surface, said end plate being joined to the outer shell cylinder adjacent the inner edge of the sloping surface wherein said small mesh circular sceen is sandwiched between



the surface of said end plate not facing the open end of said cylinder and said inner shell.

4,709,838

MULTIPLE PURPOSE HANGER

Frank P. Campbell, 11853 W. 71st Ave., Arvada, Colo. 80004

Filed Oct. 24, 1986, Ser. No. 922,723

Int. Cl.[4] A47G *25/34*

U.S. Cl. 223—85 **11 Claims**

1. Apparatus for hanging articles of clothing or the like in a clothes closet or the like by suspension from a hanger rod or the like comprising:

an elongated vertically extending article hanging means having a plurality of vertically spaced oppositely facing hook means portions and being made of one piece of material for supporting the articles of clothing or the like and having a central vertical longitudinal axis;

a support means made of one piece of material and having a hook portion for mounting on a hanger rod or the like;

swivel connecting means having a central vertical axis of rotation which is coaxial with said central vertical longitudinal axis for rotatably connecting said elongated vertically extending article hanging means to said support means and

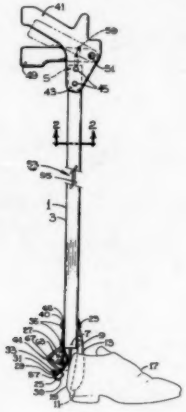
each of said oppositely facing hook means portions having a central generally circular opening having a central axis of curvature and the central axes of curvature of the circular openings being transverse to said central vertical longitudinal axis and the circular openings being generally coplanar with and located substantially along said central vertical longitudinal axis.

4,709,839

SHOE BUTLER WITH HEEL GRIPPING DEVICE

Dalton R. Tucker, San Marcos, Calif., assignor to Arcoa Industries, San Marcos, Calif.

Filed Nov. 24, 1986, Ser. No. 934,256
Int. Cl.[4] A47G *25/82*
U.S. Cl. 223—119 20 Claims



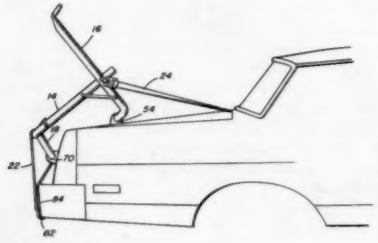
1. A shoe butler comprising:
(a) an elongated shaft terminating at spaced apart upper and lower ends;
(b) a shoe horn extending from said lower shaft end for insertion into a shoe adjacent an upper rear wall thereof;
(c) a chock held apart from behind said shoe horn by a spring attached to said shaft;
(d) means, including a handle with a finger-actuable trigger at said upper shaft end, for drawing said chock along an upwardly arcuate path into sliding contact with said shoe horn to clasp the upper rear shoe wall therebetween; and
(e) a tongue, extending from said lower shaft end, to engage said means as said chock is drawn into contact with said shoe horn, to lock said chock thereagainst for manipulating the shoe.

4,709,840

UNIVERSAL FOLDING CARRIER

Richard A. Allen, Lewis St., Lincoln, Mass. 01773

Filed Oct. 18, 1985, Ser. No. 788,749
The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.
Int. Cl.[4] B60R *9/10*
U.S. Cl. 224—314 19 Claims



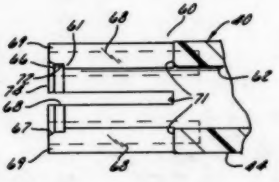
1. A folding carrier mountable on a tailgate, trunk lid or the like, said carrier configured to carry objects such as bicycles and the like, said carrier comprising:
(a) a frame;
(b) a carrying member pivotally mounted to said frame said carrying member movable between an extended position and a collapsed position, said carrying member and said frame being in a substantially side-by-side relationship when said carrying member is in its collapsed position;
(c) clamping means associated with said carrying member for mounting the carrier to a tailgate;
(d) bracing means mounted to said frame and configured to engage and disengage said carrying member, said carrying member fixed in its extended position when said bracing means is in engagement with said carrying member; and
(e) a supporting member pivotally mounted to said frame and constrained for limited rotational movement relative thereto between an extended position and a collapsed position, when said supporting member is in its extended position, a portion of said supporting member is pressed against said frame and prevents further movement of said supporting member relative to said frame said supporting member and said frame substantially in perpendicular relationship to one another when said supporting member is in its extended position, said supporting member and said frame being in a substantially side-by-side relationship when said carrying member is in its collapsed position.

4,709,841

TOOL FOR INSTALLING EXPANDABLE FASTENER

Burnell Wollar, Barrington, Ill., assignor to Phillips Plastics Corporation, Phillips, Wis.

Filed Jun. 9, 1986, Ser. No. 872,272
Int. Cl.[4] B21J *15/00, 15/38*
U.S. Cl. 227—55 13 Claims



11. As an article of manufacture
for mounting on a fastener installation tool and adapted to support and align a two-piece fastener to be installed by said tool, said fastener comprising a fastener body having a head and a relatively movable fastener pin associated with said body and insertable in a body bore in said body;
said article of manufacture taking the form of a sleeve made of resilient flexible plastic and having inner and outer ends and an axial sleeve bore therethrough for accommodating a pushrod on said tool;
at least one slot extending axially inwardly from the outer end of said sleeve to enable resilient flexing of a portion of the sleeve wall adjacent said slot whereby the sleeve bore at the outer end of said sleeve defines a recess which can receive a portion of said fastener body in frictional engagement;
and shoulder means on said sleeve near said outer end thereof and within said bore for engaging said head of said fastener body to exert axial pressure thereon.

4,709,842

TOOL FOR FASTENING AN ELONGATED OBJECT ON A SUPPORTING SURFACE BY MEANS OF U-SHAPED CLIPS

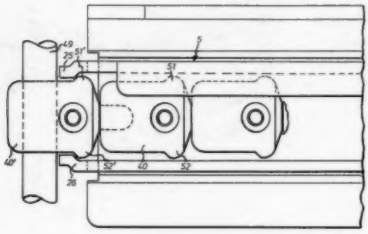
Bengt A. Westerlund, Hestra, Sweden, assignor to Isaberg AB, Hestra, Sweden

Filed Jun. 12, 1986, Ser. No. 873,378

Claims priority, application Sweden, Jun. 20, 1985, 8503074

Int. Cl.[4] B25C *5/11, 7/00*

U.S. Cl. 227—120 **6 Claims**



1. A fastening tool for use with U-shaped clips of a type which has a fastening member extending through a leg of the clip and drivable into a supporting surface with the clip embracing an elongate object such as a wire or cable on the supporting surface so as to fasten said object to said supporting surface and which also has a guide portion protruding laterally from at least one side of one leg of the clip, said tool including a magazine for receiving a succession of said clips carrying respective fastening members with the clips oriented such that the respective U-legs of each clip are disposed one after the other in the longitudinal direction of the magazine, feeding means for feeding the clips in the magazine successively to a predetermined mounting position at a front end of the tool, and driving means having a driver for driving the fastening member of a clip at said mounting position into said supporting surface such that that clip is secured over the elongated object and to the supporting surface with the elongated object being oriented transversely of the longitudinal direction of the magazine, said magazine having stop means including a guide member extending in a direction of stroke of said driver and disposed to arrest the foremost clip in succession in a protruding state at said mounting position such that the fastening member of that clip is aligned with said driver and to engage the laterally protruding guide portion of the clip in said mounting position.

4,709,843

SYSTEM FOR SECURING WEDGE SOCKETS

Juergen Wagenknecht, Pinneberg, and Dieter Raedisch, Hamburg, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

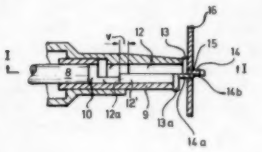
Filed Feb. 7, 1986, Ser. No. 827,356

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1985, 3504437

Int. Cl.[4] B25B *31/00;* **B25C** *1/04, 1/06*

U.S. Cl. 227—156 **9 Claims**

1. A system for securing a mounting member having a wedging socket in a hole of a structural component, comprising a fastener having a longitudinally divided shaft having first and second shaft sections which are slidable relative to each other in the longitudinal shaft direction, each of said shaft sections having a wedging portion (**14**, **14***a*) together forming said wedging socket, said shaft sections being initially axially displaced relative to each other by a defined distance (v) in a starting position, said wedging portions (**14**, **14***a*) being correspondingly axially displaced relative to each other by said defined distance (v) so that the wedging portion of said first shaft section is fully inserted in to said hole in said starting position while the wedging portion of said second shaft is only partially inserted into said hole in said starting position, said system further comprising power drive means for completely forcing said wedging portion of said second shaft section into said hole to wedge said wedging socket into said hole in a final wedged-in position, said power drive means comprising a housing having a grip, trigger means for releasing a drive stroke, and a holder recess means in said housing for holding



said shaft sections in said starting position, power driven driving means operatively mounted in said housing in alignment with an axial bore in said holder recess means for driving said second shaft section with its wedging portion into said hole in which said wedging socket is held in said final wedged-in position, and power supply means responsive to said trigger means for applying said drive stroke to said second shaft section, whereby said first shaft section limits the movement of said second shaft section to said defined distance (v).

4,709,844

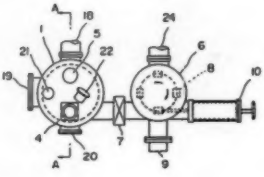
PRESSURE WELDING BONDING APPARATUS

Yukio Sekiguchi, Higashimatsuyama; Hiroyasu Funakubo, Tokyo; Hitoyuki Sakanoue, and Osamu Komura, both of Itami, all of Japan, assignors to Life Technology Research Found. and Hiroyasu Funakubo & Sumitomo Elec. Ind., Ltd., both of Tokyo, Japan

Filed Mar. 13, 1986, Ser. No. 839,180

Int. Cl.[4] B23K *20/00*

U.S. Cl. 228—3.1 **8 Claims**



1. A bonding apparatus for bonding first and second substances to one another, said apparatus comprising:

a vacuum bonding chamber in which the substances are bonded,

said bonding chamber having a first stage means for releasably supporting the first substance when the substances are bonded, and a rotary table to which said first stage means is mounted;

a vacuum preparatory chamber connected to said vacuum bonding chamber through a gate valve means and in which the substances are releasably supported;

a conveying means for conveying the substances releasably supported in said preparatory chamber to said vacuum bonding chamber along a conveying path,

said table being positionable between a predetermined position for disposing said first stage means at a first position in said conveying path and at least one other position for disposing the first stage means at a second position out of said conveying path, and said conveying means for transferring the first substance from said preparatory chamber

to said first stage means along said conveying path when said first stage means is at said first position;

a pressing means within said vacuum bonding chamber for releasably supporting the second substance, said pressing means being disposed within said vacuum bonding chamber adjacent said first stage means in said first position; and

means for moving said pressing means to a second substance receiving position in said conveying path when said first stage means is in said second position, said conveying means for transferring the second substance from said preparatory chamber along said conveying path to said pressing means when the pressing means is in said receiving position, and for moving said pressing means when releasably supporting the second substance toward said first stage means when said first stage means is in said first position and releasably supports the first substance to press the second substance against the first substance.

4,709,845

APPARATUS FOR CONTINUOUSLY PRODUCING STEEL PIPES INCLUDING USING ROTABLE BEDS OF TOOLS FOR DIFFERENT SIZE PIPE

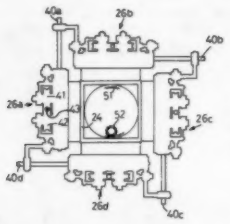
Masashi Akiyama, Kobe, and Yasuo Tagashira, Miki, both of Japan, assignors to Kusakabe Electric & Machinery Co. Ltd., Japan

Continuation of Ser. No. 620,841, Jun. 15, 1984, abandoned. This application Jan. 13, 1987, Ser. No. 4,836

Claims priority, application Japan, Mar. 15, 1984, 59-50728

Int. Cl.[4] B23K *31/06*

U.S. Cl. 228—17 **10 Claims**



1. A tube-forming machine adapted for manufacture of tubing of varying sizes, comprising:

a base;

an elongated bed adapted to be pivoted about its axis of elongation with respect to said base, said bed being generally regularly polygonal in cross-section along its length so as to define a number of tool- mounting surfaces, each of said surfaces having removably mounted thereon a set of tools making up a tube-forming line for the forming of tubing;

means for controllably rotating said bed with respect to said base, between defined angular positions, such that in a given angular position the tools on one of said beds are properly aligned with means for supply of material to said tube-forming machine and with means for finishing tubes having been formed by said machine;

means for locking said bed with respect to said base except during relative rotation thereof; and

drive means for driving at least some of said tools, wherein said drive means is stationary with respect to said base and comprises a motor and coupling means, said coupling means being actuated by a hydraulic cylinder for releasable engagement of said motor and said ones of said tools, wherein said means for locking is separate from said drive means.

4,709,846

APPARATUS FOR THE CONTINUOUS HOT TINNING OF PRINTED CIRCUIT BOARDS

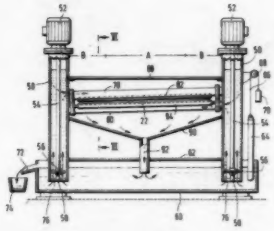
Kaspar Eidenberg, Barbarastrasse 18, D-5241 Gebhardshain, Fed. Rep. of Germany

Filed Oct. 6, 1986, Ser. No. 915,741

Claims priority, application Fed. Rep. of Germany, Oct. 11, 1985, 3536304; Nov. 8, 1985, 3539585; Dec. 23, 1985, 3545933

Int. Cl.[4] B23K *1/00*

U.S. Cl. 228—34 **34 Claims**



1. Apparatus for the continuous hot tinning of printed circuit boards, comprising: a heating station, a fluxing station, a hot tinning station, a cleaning station and a drying station; conveyor rollers for conveying said circuit boards through the apparatus, arranged approximately horizontally above and below the path of conveying movement of said circuit boards; and, at said hot tinning station, a trough for accommodating the molten tin, heating means for heating the tin in the trough, column means at respective sides of said path of conveying movement, the column means having open lower ends which dip deeply into said trough and having upper ends disposed above the level of said path of conveying movement of said circuit boards through the apparatus, nozzles arranged above and below said path of conveying movement on both sides thereof and directed towards same to apply molten tin to circuit boards passing therebetween, means connecting the inlets of said nozzles in the plane of the path of conveying movement to the column means, and pump means for pumping tin from said trough through said column means to said nozzles.

4,709,847

DEVICE FOR ASSEMBLING ELECTRICAL COMPONENTS ON A TERMINAL CARRIER PLATE

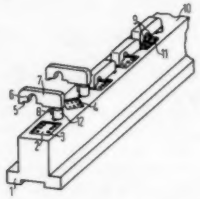
Franz Koller, Neuried, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 16, 1986, Ser. No. 886,587

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526329

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—49.1 **13 Claims**



1. A device for mounting electrical components such as coils to terminal carrier plates, comprising:

a longitudinally elongated base of synthetic material, the

base having a top surface in which is located a plurality of recesses, each recess being shaped to received a terminal carrier plate; and

a like plurality of clamping means, each clamping means being associated with a corresponding one of the receses and comprising a movable arm which is spring-biased to releasably clamp an electrical component against a terminal carrier plate located in the corresponding recess.

4,709,848

METHOD OF BONDING

Henry A. Saller, deceased, late of Columbus (by Marjorie Saller, executrix); Edwin S. Hodge; Stanley J. Paprocki, and Russell W. Dayton, all of Columbus, Ohio, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 2, 1957, Ser. No. 687,842

Int. Cl.[4] B23K *20/14*

U.S. Cl. 228—159 **4 Claims**

1. A method of making a fuel-containing structure for nuclear reactors, comprising providing an assembly comprising a plurality of fuel units; each fuel unit consisting of a core plate containing thermal-neutron-fissionable material, sheets of cladding metal on its bottom and top surfaces, said cladding sheets being of greater width and length than said core plates whereby recesses are formed at the ends and sides of said core plate, and end pieces and first side pieces of cladding metal of the same thickness as the core plate positioned in said recesses, the assembly further comprising a plurality of second side pieces of cladding metal engaging the cladding sheets so as to space the fuel units from one another, and a plurality of filler plates of an acid-dissolvable nonresilient material whose melting point is above 2000° F., each filler plate being arranged between a pair of said second side pieces and the cladding plates of two adjacent fuel units, the filler plates having the same thickness as the second side pieces; the method further comprising enclosing the entire assembly in an envelope; evacuating the interior of the entire assembly through said envelope; applying inert gas under a pressure of about 10,000 psi to the outside of said envelope while at the same time heating the assembly to a temperature above the flow point of the cladding metal but below the melting point of any material of the assembly, whereby the envelope is pressed against the assembly and integral bonds are formed between plates, sheets, first side pieces, and end pieces and between the sheets and the second side pieces; slowly cooling the assembly to room temperature; removing the envelope; and dissolving the filler plates without attacking the cladding metal.

4,709,849

SOLDER PREFORM AND METHODS EMPLOYING THE SAME

Norbert J. Socolowski, Denville, N.J., assignor to Fry Metals, Inc., Providence, R.I.

Filed Nov. 27, 1985, Ser. No. 802,240

Int. Cl.[4] B23K *35/12*

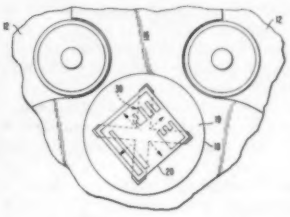
U.S. Cl. 228—246 **1 Claim**

1. A method of soldering a substantially rectangular semiconductor die to a supporting surface, comprising

providing a solder preform including a body of solder foil having four legs extending outward from a generally central base portion of the body at angles corresponding to angles between the diagonals of the semiconductor die,

placing the solder preform in a desired position with its legs on the supporting surface,

placing the semiconductor die on the solder preform, with the die being positioned such that the base portion of the preform lies substantially beneath the center of the die and the legs of the preform lie beneath the diagonals of the die, the legs of the preform being of sufficient length such that with the die positioned on the preform as aforesaid they project slightly outward from respective corners of the die and thereby indicate alignment of the legs with the diagonals of the die positioned thereon,



heating the preform sufficiently to melt the solder thereof and to cause the solder to flow, solder flow between the die and the supporting surface being generally away from the base portion of the preform toward the periphery of the die, and

cooling the flowed solder to solidify the same and thereby bond the die to the supporting surface.

4,709,850

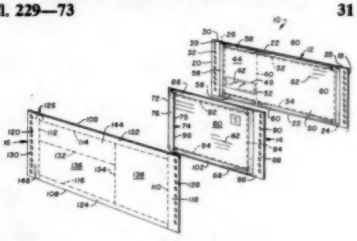
MAILER INCLUDING RETURN ENVELOPE AND REMITTANCE STUB COMBINED IN OUTER ENVELOPE

David G. Wagner, Amherst, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Mar. 20, 1986, Ser. No. 841,814

Int. Cl.[4] B65D *27/10, 27/06, 27/34*

U.S. Cl. 229—73 **31 Claims**



1. A mailer, comprising:

an inner envelope defined between two superimposed generally rectangular panels of sheet material having respectively joined marginal strips extending along adjacent three edges of each, one of these two panels having a fourth edge along which that one panel is not joined to the other, so that an at least potentially open mouth is provided for said inner envelope;

means defining a closure flap for said mouth of said inner envelope, said closure flap being foldably joined to said one panel along said fourth edge so that said closure flap may be externally overlapped with the other of said two panels;

a strip of activatable inactivated adhesive adapted, when activated, to secure said closure flap onto said other of said two panels in externally overlapped condition therewith, thereby sealingly closing said mouth of said inner envelope;

said other of said two panels, outwardly of said mouth, including an extension panel joined thereto along a line that with said fourth edge of said one panel defines said mouth of said inner envelope; and

an outer envelope defined by:

said other of said two panels, and said extension panel together constituting a first member having a perimetrically extending margin having at least two opposite edges;

a second member comprising a sheet of material having a perimetrically extending margin having at least two opposite edges; and

means severably connecting said margin of said first member along at least two of said opposite edges thereof to said margin of said second member along a corresponding at least two of said opposite edges thereof, with said second member covering at least a substantial portion of said one panel, including said mouth of said inner envelope,

so that upon severing said connecting means and thereby disconnecting said second member from said first member, said extension panel may be displaced, said strip of adhesive actuated and urged into externally overlapping condition with said other of said two panels thereby sealingly closing said mouth of said inner envelope;

said flap being foldably joined to said fourth edge of said one panel for rotation substantilly 360 degrees about said fourth edge as an axis; and

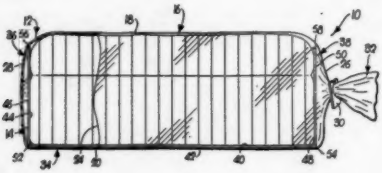
said flap being doubled-back upon said one panel and releasably held there by said second member so long as said second member is severably connected marginally thereof to said first member by said severable connecting means.

4,709,851

PACKAGE FOR LOAF OF BREAD

Robert W. Vanasse, Overland Park, Kans., assignor to Interstate Brands Corporation, Kansas City, Mo.

Continuation of Ser. No. 882,429, Jul. 7, 1986, abandoned, which is a continuation of Ser. No. 680,133, Dec. 10, 1984, abandoned.
This application Feb. 17, 1987, Ser. No. 15,790
Int. Cl.[4] B65D *33/02*
U.S. Cl. 229—87 B **1 Claim**



1. A bread package comprising:

an elongated loaf of bread presenting a bottom surface, a pair of spaced apart upstanding heel surfaces, elongated upstanding sidewall surfaces, and an upper surface;

an elongated, U-shaped, lightweight cardboard support member for said loaf of bread, said member having an elongated bottom panel in direct contact with said bottom surface of the loaf of bread, and a pair of marginal, upstanding end flaps respectively in direct engagement with corresponding heel surfaces of the bread loaf,

there being respective transverse lines of weakness operably connecting each of said flaps to said bottom panel for swinging movement thereof with respect to the bottom panel and away from the adjacent heel surface,

each of said flaps being of a height and a width to be substantially coincident with the height and width of the corresponding adjacent heel surface; and

an elongated flexible bag completely enclosing said loaf of bread and support therefor in a closely conforming relationship about the entire outer surface presented by the bread loaf and support,

said upright end flaps, and the closely conforming portions of said bag, cooperatively serving to prevent undue compression of said bread loaf in the event that additional bread packages are placed atop said bread package,

said U-shaped support member having sufficient rigidity and structural integrity in relation to said closely conforming bag and said loaf of bread for removal of the bread loaf bodily from said bag by grasping one of said flaps and slowly pulling both the support member and the bread loaf from the bag,

the lightweight cardboard material making up said flaps, and said respective lines of weakness, imparting sufficient flexibility to said support member in relation to said closely conforming bag and said loaf of bread for removal of the support member from said bag while leaving said bread loaf within the confines of the bag, by grasping one of said flaps and quickly jerking the support from the bag,

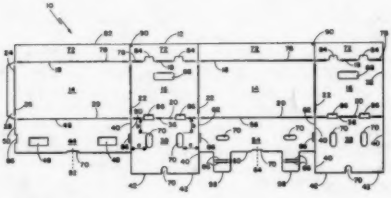
said U-shaped support member and bag being the sole support means for maintaining said loaf in its desired position within said package.

4,709,852

PRODUCE TRANSPORT AND COOLING CONTAINER AND METHOD FOR USING SAME

Mark S. Stoll, Deephaven, Minn., assignor to Liberty Diversified Industries, Minneapolis, Minn.

Filed Jul. 24, 1986, Ser. No. 888,719
Int. Cl.[4] B65D *21/00, 5/36*
U.S. Cl. 229—119 **9 Claims**



1. A produce transport and cooling container comprising:

four substantially rectangular and generally vertical wall panels each having a top edge and a bottom edge, and assembled to form a generally box-shaped receptacle; and

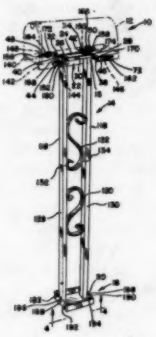
at least two bottom support panels extending generally downward from the bottom edges of two opposing said wall panels and hingedly connected thereto along score lines, said bottom support panels each having a bottom edge, one of said bottom panels defining one or more apertures extending through the surface of said panel proximate to said bottom edge of said bottom support panel, the other of said bottom support panels having the same number of retroverse tabs extending from the bottom edge of said other bottom support panel as the number of said apertures, said retroverse tabs positioned along said bottom edge of said other bottom support panel to overlap and communicate with said apertures when said bottom support panels are folded upwardly and inwardly at generally right angles along said score lines to a horizontal position between said vertical wall panels, said retroverse tabs having one or more score lines traversing said retroverse tabs adjacent to and in overlapping comunication with said apertures, said retroverse tabs being insertable through said apertures and foldable over and generally parallel the planar surfaces of said bottom support panels.

4,709,853

ADJUSTABLE PLATFORM MEANS

Ronald R. Hahn, Barrington, Ill., assignor to Hahn Manufacturing Co., Franklin Park, Ill.

Filed Nov. 21, 1985, Ser. No. 790,390
Int. Cl.[4] B65D *91/00*
U.S. Cl. 232—39 16 Claims



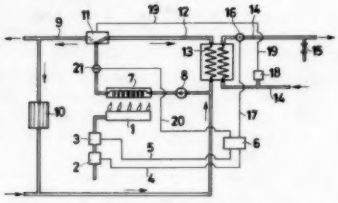
16. In combination, a rural mailbox and support comprising:
a box member;
vertical member support means for supporting said box member;
a base for mounting said vertical support means in the ground;
a pair of C-shaped base members extending laterally from said vertical support means, each of said pair of said C-shaped base members having a first and second extending arm and each of said first and second extending arms having one or more longitudinal slots and an L-shaped bracket member attached thereon and adapted for attachment to said box member; and,
each of said L-shaped bracket members having one or more longitudinal bracket slots formed therein and one or more locking tabs at the proximal and distal ends thereof for insertion into and engagement with said one or more longitudinal slots in said extending arms.

4,709,854

SYSTEM FOR REGULATING TEMPERATURE OF HOT WATER IN WALL-HUNG INSTANTANEOUS MIXED GAS HEATING UNITS

Giuliano Biagini, and Roberto Bartolozzi, both of Florence, Italy, assignors to Nuovopignone-Industrie Meccaniche e Fonderia S.p.A., Florence, Italy

Filed May 18, 1987, Ser. No. 51,498
Claims priority, application Italy, May 23, 1986, 20544 A/86
Int. Cl.[4] F24D *3/08*
U.S. Cl. 236—20 R 2 Claims



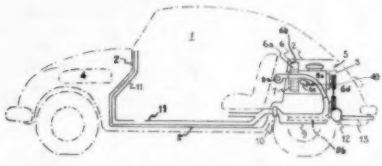
1. System for regulating temperature of hot water in a wall-hung instantaneous mixed gas heating unit comprising a burner fired by gas through a first electrically-controlled on/off operating valve and a second gas modulating valve, also electrically controlled, said burner yielding heat, through a lamellar heat exchanger, to the heating system water circulated by a pump in the radiator circuit or, through a three-way valve, in the primary circuit of a heat exchanger is whose secondary circuit, where the hot water circulates, is inserted a flow switch which commands said three-way valve as well as a hot water temperature sensor, characterized by the fact that the electric signal generated by this hot water temperature sensor is compared with an electric set signal entered through a potentiometer, and their error or difference signal is sent in input to an amplifier of the proportional - integrational - derivative type (P.I.D.), whose output is connected to one input of a minimum power selector, to the other input of which is sent the error or difference signal between the temperature of the heating system water detected by a second sensor in the primary circuit on output from the lamellar heat exchanger, and the maximum tolerable set temperature, the output of this minimum power selector being sent to command the second gas modulating valve through a power amplifier, and the first on/off operating valve after having been compared with an electric signal proportional to the minimum thermal power that can be supplied by the heating unit.

4,709,855

RECIRCULATING HEATING SYSTEM

Barnett S. Brenner, 343 E. Prince Rd., Tucson, Ariz. 85705

Filed Jun. 30, 1986, Ser. No. 880,291
Int. Cl.[4] B60H *1/02*
U.S. Cl. 237—12.3 A 4 Claims



1. A motor vehicle having a rear or mid-mounted engine and a heating system comprising
an engine cooling air blower for directing cool air drawn from outside the vehicle through passages in the engine,
duct or conduit means for directing said cooling air to heat exchanger means to be warmed by indirect heat exchange with hot engine exhaust gas,
means for conducting said warmed air from said exchanger means to the passenger compartment,
an air blower driven by an electric motor, preferably mounted on the vehicle's firewall, for drawing air through passageways from the passenger compartment and discharging it into channel means connected at one end to said driven air blower and at the other end to inlets of said heat exchanger means, whereby air drawn from the passenger compartment is circulated through the heat exchanger means and back to the passenger compartment as needed for providing a recirculating heated air system while not allowing infiltration of dust or pollen from outside air usually stirred up by rotating front wheels of the motor vehicle and
plug means provded at the hose connections at the exits of said channel means.

4,709,856
ELECTRICAL AND MECHANICAL COUPLING FOR MODEL RAIL SECTIONS

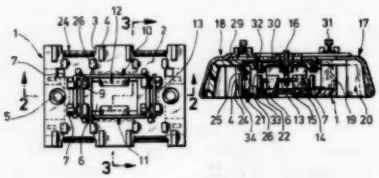
Helmut Röther, Wangen, and Manfred Reyher, Hattenhofen, both of Fed. Rep. of Germany, assignors to Gebr. Marklin & Cie. GmbH, Fed. Rep. of Germany

Filed Oct. 9, 1986, Ser. No. 916,832

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1985, 3536631

Int. Cl.[4] E01B *23/04, 11/54*

U.S. Cl. 238—10 E **20 Claims**



1. A coupling for two adjacent rail sections of a model railway comprising a bed member with rails and a conductor rail held thereon, projections in electrically conductive connection with said rail and said conductor rail, a coupling member arranged beneath said adjacent bed members and carrying at least two upwardly open locking elements that are separate from one another and consist of electrically conductive material which is elastically deformable, said projections engaging said locking elements from above, whereby each of the projections on the adjacent rail sections are mechanically and electrically connectable to one another via one locking element, characterized in that one locking element comprises upwardly protruding elastic tongues, with the projections engaging this locking element resting thereagainst, and the other said locking element comprises for each projection **(15)** of the two adjacent rail sections **(18)** two spring wires **(10, 11)** extending parallel to each other, whose distance apart is set by atC least one spacer **(7)**, and wherein said projection **(15)** is provided with a recess and is insertable between these spring wires **(10, 11)** in an insertion area beside the spacer **(7)** in which said spring-wires can be elastically bent apart.

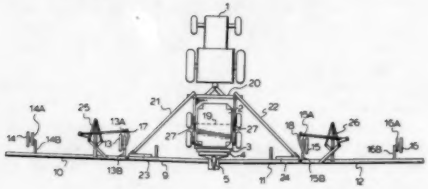
4,709,857
VARIABLE HEIGHT FIELD SPRAYER FRAME

Wilfed H. Wilger, 219 Ball Crescent, Saskatoon, Saskatchewan, Canada S7K 6E1

Filed Nov. 20, 1986, Ser. No. 932,883

Int. Cl.[4] B05B *1/20*

U.S. Cl. 239—164 **5 Claims**



1. A frame for a field sprayer that is foldable to a narrow width transportation mode and extendable to a broad width working mode for wide swath application of spray from nozzles mounted thereon, the folding and extension of the frame being operable from a position at the controls of a motive power source serving to pull the sprayer, said frame comprising:

(a) a vertical planar rectangular guide frame mounted rigidly at the back of said motive power source,

(b) a moveable boom hitch bracket mounted in said guide frame and adapted to move only vertically but freely therein,

(c) a power source adapted to move and position said boom hitch bracket in said guide frame, operable from the controls of said motive power source,

(d) a boom hitch rigidly attached to said boom hitch bracket, adapted to move vertically with said bracket and to support and pull the inner ends of elongated boom sections of the sprayer frame,

(e) two universal hinges mounted on said boom hitch, each adapted to pivot on a common vertical axis and each adapted to attach, through separate pivots on horizontal axes, to a respective inner end of an elongated boom section,

(f) two elongated main boom sections, each attached by its inner end to a respective one of said universal hinges to pivot in a horizontal plane around the vertical axis of its hinge and to pivot in a vertical plane around the horizontal axis of its hinge,

(g) two wheel mount brackets, each rigidly fastened to a respective boom section near the outer end thereof, each having a distal end section hinged thereto on a verical axis,

(h) two wheel support frames each associated with a respective wheel mount bracket, moveably mounted in the hinged distal end section of its respective bracket, and held in vertical relative position with reference thereto by first taut cable means having one end fastened to a fixed point by the bottom of said guide frame, said cable means passing over pulley means to extend past the associated universal hinge, along the associated boom section, wheel mount bracket, and upwardly to the associated wheel support frame to which its distal end is fastened near the top thereof, above the level of the boom section,

(i) wheel means each with an axle in the base of a respective wheel support frame, maintaining the wheel means aligned with the support frame,

(j) power operated wheel pivoting means pivotally connected between each wheel support frame and associated boom section and adapted to pivot the associated wheel and support frame between positions respectively parallel to and normal to the boom section on the hinge axis of the hinged distal end section of the associated wheel mount bracket,

(k) a rigid inverted U-shaped member pivoted at its lower extremities on a horizontal axis which is positioned parallel to said planar guide frame at an elevation proximate the lowest operating level of said boom hitch and proximate the midpoint of the length of said motive power source, said member being adapted to pivot so that its upper extremity oscillates between a forward position proximate the front of said motive power source and a rearmost position approximately vertically above said boom hitch,

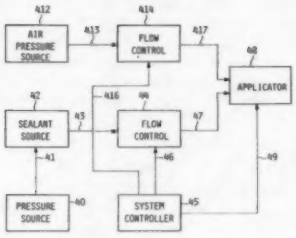
(l) power means to pivot said U-shaped member between said forward and rearmost positions, and

(m) an elongated rigid brace member associated with each said elogated boom sections, each brace member extending from a respective point of attachment of its forward end near the upper extremity of said U-shaped member to a respective point of attachment of its distal end near the outer end of its associated boom section, said forward end being longitudinally moveably attached to said U-shaped member and adapted to releasably latch relative to its point of attachment, said distal end being attached to said boom section by means adapted to permit movement of said distal end along a portion of the length of said boom section and to latch it releasably at the outermost extremity of said movement.

4,709,858
DIGITAL FLOW CONTROL SYSTEM

Howard Stern, Greenlawn; Alex Mauro, Wheatley Heights, and Jay Lee, Kings Park, all of N.Y., assignors to Robotic Vision System, Inc., Hauppauge, N.Y.

Filed Mar. 14, 1986, Ser. No. 840,326
Int. Cl.[4] B05B *1/28*
U.S. Cl. 239—296 **1 Claim**



1. An arrangement for enabling air-assisted fluid material deposition shape control, comprising: a source of fluid for deposition supplied at predetermined pressure; an inlet manifold for dividing incoming fluid into at least two paths; a restricting orifice in each said path for setting a predetermined flow rate in said path; a controllable valve in each said path for transmitting flow or blocking flow of said fluid; an outlet manifold for combining said fluid from each said path into an output conduit; applicating means having a central orifice for material deposition and at least one air stream orifice located lateral to said central orifice with respect to intended direction of travel during material deposition; said applicating means forming a fluid bead profile of predetermined size and shape; a source of air supplied at predetermined pressure; an inlet manifold for dividing incoming air into at least two air paths; an air restricting orifice in each said air path for setting a predetermined flow rate in said air path; a controllable valve in each said air path for transmitting flow or blocking flow of said air; and outlet manifold for combining said air from each said path into an output conduit; and a system controller for controlling the flow rate of said fluid and the flow rate of said air to said applicating means, directed flow of said air controlling shape and size of said fluid bead profile emitted from said applicating means, said air being emitted from said air restricting orifices in substantially concentrated streams to prevent said fluid bead from spreading more than a predetermined amount.

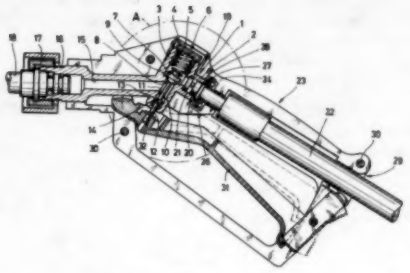
4,709,859
HIGH PRESSURE WASHING APPARATUS

Werner Schulze, Winnenden-Höfen, and Josef Gerich, Winnenden, both of Fed. Rep. of Germany, assignors to Alfred Karcher GmbH & Co., Winnenden, Fed. Rep. of Germany

Filed Feb. 25, 1985, Ser. No. 705,066
Claims priority, application Fed. Rep. of Germany, Mar. 2, 1984, 3407744
Int. Cl.[4] B05B *9/01*
U.S. Cl. 239—525 **8 Claims**

1. High pressure washing apparatus that can operate with hot water or steam comprising a spray handle having two mating housing sections formed of a plastic material,
- a central body located within the housing section having a socket and a connection for a spray tube,
- a shutoff valve disposed within said central body,
- a bearing surface formed at the interior of said housing sections,
- a flexible high pressure hose,
- a hose nipple secured on a end of the hose adjacent said spray handle and insertable into the socket, and
- a flange secured on said hose nipple,

said housing section, when mated, replaceably capturing and supporting said hose nipple within said socket, and containing a central body, said bearing surface and said flange, said flange being secured, in a sealed fashion, against the bearing surface and thereby blocked from pulling out of the socket, and

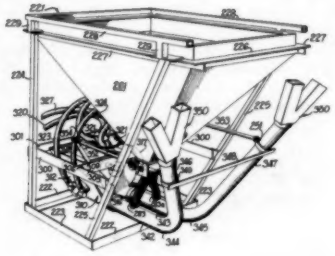


said bearing surface and said flange surrounding said hose nipple being rotatable with respect to one another around the longitudinal axis of the hose nipple.

4,709,860
SYSTEM FOR APPLYING PESTICIDES WITHOUT DRIFT

Keith H. Patrick, Birmingham, and Charles W. Murchison, Montgomery, both of Ala., assignors to Omni Spray, Inc., Prattville, Ala.

Continuation of Ser. No. 616,383, May 31, 1984, abandoned. This application Mar. 27, 1986, Ser. No. 843,803
Int. Cl.[4] A04C *15/04*
U.S. Cl. 239—654 **18 Claims**



1. An apparatus for spraying particulates from a moving vehicle comprising:
- a hopper supportable by said vehicle for storing the particulates,

said hopper having a hopper discharge opening out through which said particulates can pass,
- a tubular barrel supportable by said vehicle,

said tubular barrel having a first barrel end and a second barrel end,
- an air blower means operatively connected to said first barrel end for blowing air through said barrel and out said second barrel end,
- a conduit means for directing said particulates into the air passing through said barrel,
- a metering means communicating with said hopper discharge opening and with said conduit for receiving said particulates from said discharge opening and progressively delivering metered amounts of said particulates to said conduit means,
- a supporting means for supporting said barrel and providing for a swinging pendulum action of said barrel relative to

said vehicle to help maintain the orientation of the tubular barrel as said vehicle travels over uneven and sloping terrain,

said supporting means including a cradle mounted for swinging action about a longitudinal axis of said vehicle, a connecting means for connecting said barrel to said cradle so that said barrel and cradle move together, and

a dampening means connected to said cradle for dampening the swinging action of said cradle and barrel.

4,709,861

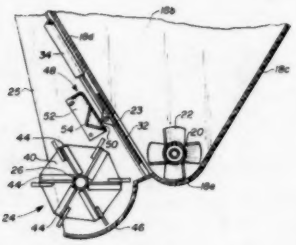
EXPELLED DEFLECTOR FOR MANURE SPREADERS

James S. Henderson, New Holland, Pa., assignor to New Holland Inc., New Holland, Pa.

Filed Oct. 21, 1986, Ser. No. 921,652

Int. Cl.[4] A01C *15/16*

U.S. Cl. 239—675 **6 Claims**



1. In a manure spreader having a tank for containing manure, an auger rotatably mounted in said tank for moving manure toward an opening formed in said tank, an expeller rotatably disposed adjacent said opening to discharge manure away from said tank, said expeller engaging manure exiting said tank through said opening on an inner side of said expeller, the improvement comprising:

deflector means located on said inner side of said expeller and cooperating with said expeller for breaking up clumps of manure after they exit said tank through said opening but before they are discharged by said expeller.

4,709,862

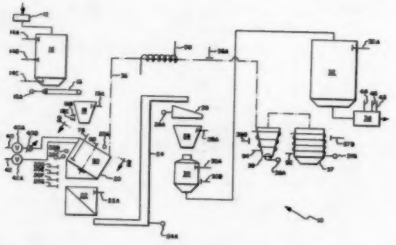
METHOD OF RECLAIMING GREEN SAND

Dieter S. Leidel, R.R. No. 5, Barrie, Ontario L4M 4S7, Canada

Filed Jan. 30, 1987, Ser. No. 8,748

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—23 **9 Claims**



1. A process for reclaiming green sand including:

successively presenting portions of said sand to a reclaiming unit;

sensing the initial temperature of each said portion presented to said unit; and

selectively subjecting each said portion within said unit to attrition and cooling by the exhaust of air and water vapor from said unit when said initial temperature is within the range of about 120° F. to 140° F. until the temperature of said portion is reduced to about 120° F. and said portion is free flowing, or to cooling by the addition of water when said initial temperature is above about 140° F. until the temperature of said portion is reduced to about 140° F. and to attrition and cooling by exhaust of air and water vapor from said unit until the temperature of said portion is reduced to about 120° F. and is free flowing, or to heating to raise the temperature of said portion to about 140° F. when said initial temperature is below about 120° F. and to attrition and cooling by exhaust of air and water vapor from said unit until the temperature of said portion is reduced to about 120° F. and said portion is free flowing.

4,709,863

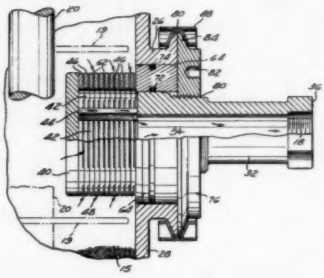
MEDIA MILL SCREEN ASSEMBLY

Edward J. Szkaradek, Santa Ana, and John J. Corrigan, Garden Grove, both of Calif., assignors to Morehouse Industries, Inc., Fullerton, Calif.

Continuation-in-part of Ser. No. 784,865, Oct. 4, 1985, which is a continuation-in-part of Ser. No. 746,440, Jun. 21, 1985, Pat. No. 4,624,418, which is a continuation-in-part of Ser. No. 663,049, Oct. 19, 1984, Pat. No. 4,651,935, and a continuation-in-part of Ser. No. 627,918, Jul. 5, 1984, abandoned. This application Feb. 26, 1986, Ser. No. 833,854

Int. Cl.[4] B02C *17/16*

U.S. Cl. 241—69 **11 Claims**



1. A milling apparatus comprising:

a vessel for receiving grinding media and a liquid having small particles therein which are to be milled or reduced in size within the vessel;

a motor driven rotor in said vessel for agitating the grinding media;

a liquid inlet to which said liquid is introduced as the grinding media is agitated by the rotor;

a liquid outlet in said vessel; and

a screen assembly at said outlet to prevent the media from passing through said outlet while permitting the liquid to pass through said outlet, said assembly including a plurality of ring-shaped screen elements arranged in a stack, each of said elements having a plurality of projections extending from one axial face of the element and a plurality of recesses extending into its other axial face, with each projection being axially aligned with a recess, with said projections and recesses having a similarly shaped cross-section, said elements being stacked so that the projections on said elements space said elements from each other to provide a gap or passage smaller than said media whereby liquid may flow through the passage but said media may not;

said projections and recesses being sized so that the projections of one ring will partially nest into the recesses of an adjacent ring when said rings are rotatably oriented in one

circumferentially indexed position with the projections on the face of one ring facing the recessed face of an adjacent ring, whereby said gap is approximately equal to the height of a projection minus the portion of the projection which extends into the recess of the adjacent ring;

said projections and recesses being formed so that when said rings are rotated to a second circumferentially indexed position wherein the projections of one ring extended toward the recessed face of the adjacent ring engage the face of said adjacent ring so that said gap is approximately equal to the height of one of said projections, and

said rings having means for indexing the rings in said first and second positions.

4,709,864

METHOD AND APPARATUS FOR THE CRUSHING OF MATERIAL

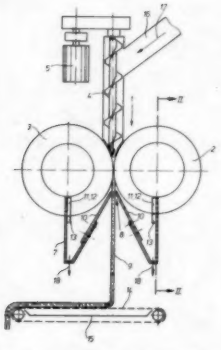
Heinrich Henne, Ennigerloh; Norbert Patzelt, Beckum; Lutz T. Schneider, Ennigerloh; Osbert Knobloch, Rheda-Wiedenbruck, and Manfred Muller, Ennigerloh, all of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Beckum, Fed. Rep. of Germany

Filed Jun. 30, 1986, Ser. No. 880,089

Claims priority, application Fed. Rep. of Germany, Jul. 19, 1985, 3525935

Int. Cl.[4] B02C *4/40*

U.S. Cl. 241—167 **4 Claims**



1. Apparatus for simultaneously removing water from and crushing material having a high moisture content by passage between two rolls which are urged together under high pressure, said apparatus comprising screw conveyor means for simultaneously subjecting said material to mechanical precompression and forcible direct delivery between the two rolls, the fluid flow from said moisture removal being forced to the sides of said rollers and backward of the direction of material movement during crushing; means for separating the fluid pressed out of said material during crushing from the crushed material emerging from between the two rolls as a stream of particles immediately below the rolls to prevent remoistening of the particles, said separating means including blade means for separating fluid from the emerging crushed material; and wiping strips cooperating with the end and peripheral faces of said rolls for separating fluid pressed out of said material and carried along by said rolls during their rotation, said separating means including water collection and passage means for conducting the separated fluid away from said rolls.

4,709,865

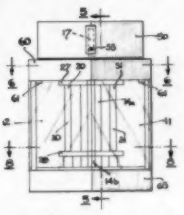
DUAL CONDIMENT MILL

William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505

Filed Dec. 30, 1982, Ser. No. 454,736

Int. Cl.[4] B02C *25/00*

U.S. Cl. 241—169.1 **7 Claims**



1. A dual condiment mill comprising:

first and second compartments having top and bottom ends and a divider wall therebetween, each of said compartments for containing a separate condiment to be ground,

a first and second grinder installed at the bottom of each compartment respectively,

first and second shafts having bottom ends fixedly attached to each of said grinders and top ends respectively extending upwardly through their associated compartments,

first and second gears fixedly attached to the top ends of each of said first and second shafts respectively,

gear drive means pivotally supported on said mill opposite said gears, and

means for use in alternatively driving the gear drive means rotatably in a first direction to engage and rotatably drive only the first of said gears, shafts and grinders or in a second direction opposite to said first direction to rotatably drive only the second of said gears, shafts and grinders.

4,709,866

THREAD GUIDING AND SCREENING ELEMENT FOR USE IN FILAMENT WINDER

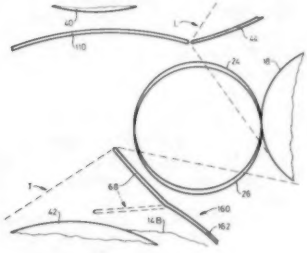
Kurt Schefer, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Jan. 12, 1987, Ser. No. 2,164

Claims priority, application United Kingdom, Jan. 22, 1986, 8601453

Int. Cl.[4] B65H *67/044*

U.S. Cl. 242—18 A **10 Claims**



1. A winder for thread comprising

a contact member rotatable about a longitudinal axis thereof for receiving and delivering a travelling thread;

a first chuck movable between a first rest position above said contact member and a winding position adjacent said

contact member to receive and wind a thread into a thread package thereon;

a second chuck movable between a second rest position below said contact member and a winding position adjacent said contact member to receive and wind a thread into a thread package thereon; and

a screen having an operative position between said contact member and said second chuck during movement of said second chuck to said second rest position to screen a package on said second chuck from said contact member and a package forming on said first chuck, said screen including a guide element to divert a thread extending between said contact member and a package on said second chuck towards said first chuck in said operative position.

4,709,867

METHOD AND APPARATUS FOR REELING A WEB

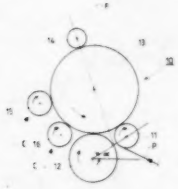
Hannu U. Oinonen, Järvenpää , Finland, assignor to Oy Wartsila Oy, Finland

Filed Jul. 30, 1986, Ser. No. 890,734

Claims priority, application Finland, Aug. 6, 1985, 853019

Int. Cl.[4] B65H *18/20, 19/28, 19/30*

U.S. Cl. 242—56 R **21 Claims**



1. A method for reeling a web, comprising the steps of:

feeding a web onto a web roll being formed while supporting the web roll being formed on first and second carrying rolls with a topside pressing roll pressing down with a pressing force on the web roll being formed;

accelerating rotation of at least two lowering rolls situated below said web roll until said lowering rolls rotate with an appropriate surface velocity;

upon substantial completion of said web roll, elevating said lowering rolls along respective movement paths into engagement with said completed web roll;

interrupting the web to provide a cut-off end of the web;

lowering said completed web roll by lowering said lowering rolls;

at substantially the same time as said completed web roll is being lowered, inserting a new core tube in a throat defined between said first and second carrying rolls; and

affixing the cut-off end of the web to the new core tube to initiate formation of a new web roll.

4,709,868

SETTING AND WINDING MECHANISM FOR TAPE-LIKE LAMINATE IN LAMINATOR

Tadao Kashiwaba, Iwate, Japan, assignor to Kabushiki Kaisha Sato, Japan

Filed Feb. 21, 1986, Ser. No. 832,041

Claims priority, application Japan, Feb. 28, 1985, 60-37532

Int. Cl.[4] B65H *54/71;* **B26D** *5/20*

U.S. Cl. 242—56 R **3 Claims**

1. A setting and winding mechanism for a tape-like laminate strip having a printed medium disposed on said strip, for use in a laminator, the setting and winding mechanism comprising:

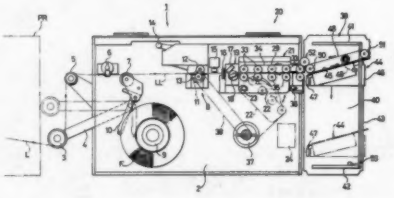
a feeding device for moving the tape-like laminate strip through the mechanism;

a take-up device for receiving a leading end of the tape-like laminate strip from the feeding device, the feeding device and take-up device being responsive to a first start signal to feed the laminate strip from the feeding device to the take-up device during a setting mode of the mechanism;

sensing means for detecting predetermined positions on the tape-like laminate strip and for producing an output signal in response to detection of the positions;

cutting means disposed relative to the laminate strip for cutting the laminate strip at predetermined locations thereof, in response to the output signal;

delivery means for receiving successively cut laminate pieces from the cutting means, the delivery means and the



feeding device being responsive to a second start signal to feed the laminate strip past the cutting means and for delivering the cut pieces out of the setting and winding mechanism;

a first start switch and a second start switch for initiating, respectively, the first and second start signals; and

drive controlling means coupled to the feeding device, to the take-up device and to the delivery means for causing the leading end of the tape-like laminate strip to be wound on the take-up device in response to the first start signal and for causing the cutting means to produce the cut laminate pieces and the delivery means to delivery the cut pieces out of the setting and winding mechanism.

4,709,869

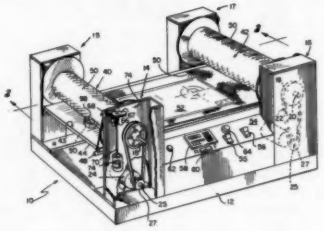
FILM STORAGE SYSTEM

Darrell E. Candler, 10651 Vandergriff Rd., Indianapolis, Ind. 46239

Filed Apr. 14, 1986, Ser. No. 851,821

Int. Cl.[4] B65H *18/00;* **G09F** *11/18;* **B65B** *63/04;* **B42D** *1/00*

U.S. Cl. 242—673 R **16 Claims**



8. An apparatus for storing and retrieving sheets of film-like material, comprising

a base having two spaced apart pairs of opposed support columns extending upwardly therefrom;

a pair of rollers;

the support colums including means for rotatably and removably mounting the rollers;

a film like substrate for holding the sheets which has a portion wound on each roller when in use for storing and retrieving the sheets and having an exposed portion ex-

tending between the rollers for receiving a sheet to be stored and from which a stored sheet can be removed,

a movable bed;

suspending means for suspending the movable bed from the support columns beneath the rollers when the rollers are mounted to the support columns, the suspending means including urging means for urging portions of the bed up against the rollers;

rotating means for rotating at least one of the rollers for winding the substrate onto one of the rollers and unwinding it from the other roller;

counting means for counting each revolution of a counting roller and accumulating a first count, the first count, when a sheet is placed on the exposed portion of the substrate for storage, indicative of a location on the substrate on which the sheet is stored;

retrieval means for retrieving a desired stored sheet including

means for causing the rotating means to rotate at least one of the rollers to unwind a roll of substrate containing stored sheets from one roller and wind it onto the other roller;

second counting means for counting each revolution of the counting roller to accumulate a second count; and

means for comparing the first count indicative of the location of the desired sheet on the substrate with the second count and causing the rotating means to cease rotating the roller when the first and second counts match.

4,709,870

DEVICE FOR REPLACEABLY SUSPENDING THE WINDING SHAFT OF A BALE OF CLOTH

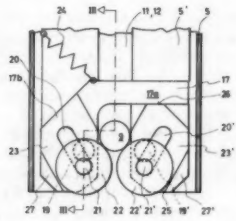
Gustav G. Veith, and Götz U. Veith, both of Frasdorf, Fed. Rep. of Germany, assignors to Gustav Georg Veith GmbH & Co., Fed. Rep. of Germany

Filed Apr. 1, 1986, Ser. No. 846,965

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519591

Int. Cl.[4] B65H *16/06*

U.S. Cl. 242—68 **10 Claims**



1. A device for releasably suspending a winding shaft for a bale of cloth, comprising:

at least one suspension carrier provided with a downwardly extendable member, said downwardly extendable member containing a slot having a downwardly extending opening and being dimensioned to receive said winding shaft;

bearing means for rotatably supporting said winding shaft when it is inserted into said slot, said bearing means having first and second components arranged at opposite sides of said slot, at least one of said components being mounted for transverse movement relative to said slot from a first position to a second position such that in said first position said at least one component extends into said slot below said winding shaft when said shaft is inserted into said slot, the distance between said components then being smaller than the diameter of said winding shaft, the distance between said components being greater than said diameter in said second position;

means for releasably locking said at least one of said components in said first position, so that said winding shaft is able to be supported by said components when said at least one component is in said first position and to be released from said components when said at least one component is in said second position.

4,709,871

REEL RECEIVING DEVICE

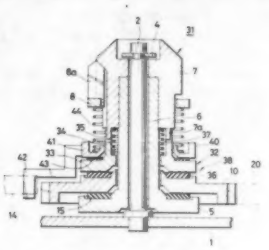
Shinsaku Tanaka, Tokyo, and Kunio Kido, Wako, both of Japan, assignors to Tanashin Denki Co., Ltd., Tokyo, Japan

Filed Nov. 5, 1986, Ser. No. 927,184

Claims priority, application Japan, Feb. 13, 1986, 61-19391[U]

Int. Cl.[4] B65H *20/36, 20/38*

U.S. Cl. 242—68.3 **3 Claims**



1. A reel receiving device, comprising a reel shaft erected on a base, a reel receiving body mounted for rotation on said reel shaft and having an engaging portion adapted to engage with a tape reel, said reel receiving body further having a pair of axially opposing surfaces, a friction transmission mechanism mounted for rotation on an outer periphery of said reel receiving body for frictionally transmitting a turning force of a motor to said reel receiving body, a friction coupling member located between said pair of opposing surfaces of said reel receiving body, and a spring member interposed between said friction coupling member and one of said opposing surfaces of said reel receiving body for pressing said friction coupling member toward the other of said opposing surfaces, said friction coupling member engaging with a mechanism which operates in response to rotation or stopping of said reel receiving body.

4,709,872

WEB TENSION CONTROL AND EMERGENCY STOP SYSTEM

Josef Hammer, Asbach-Bäumenheim, and Walter Handschuher, Königsbrunn, both of Fed. Rep. of Germany, assignors to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Feb. 24, 1987, Ser. No. 17,758

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608182

Int. Cl.[4] B65H *26/00*

U.S. Cl. 242—75.43 **14 Claims**

1. Web tension control and combined rapid-stop system, particularly for paper webs being delivered to a rotary web printing machine, said system having

a roll support carrier (**1, 2, 3**) for supporting at least one roll (**4, 5**) on which the web (**14**) is wound;

a first brake forming an operating brake (**10**) secured to the support carrier for braking the at least one roll upon unwinding thereof;

a second brake forming a fast stop brake (**11**) secured to the support carrier and additionally braking the at least one roll for fast stopping condition;

a movably journaled tension or compensating roller (**17**) about which the web (**14**), unreeled from the at least one roll is looped;

a tension sensing means (**21, 24**) for sensing the position of

the tension or compensating roller and for providing a tension signal;

a computer-controller unit (**28**) receiving the tension signal, and

a source of fluid pressure (**29**),

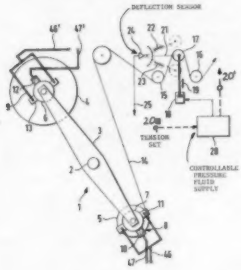
and comprising

an electrically controllable fluid pressure regulator (**26**) receiving pressurized fluid from said source (**29**) connected to and controlled by the computer-controller unit (**28**) and providing fluid pressure output at a regulated pressure level, as commanded by said computer-controller unit (**28**);

an electrically controlled magnetic valve (**36**) having two pressure fluid outputs (**41, 43**) connected to and controlled by said computer-controller unit (**28**);

means (**35**) for supplying pressure fluid from said fluid pressure regulator (**26**) to said valve (**36**);

a fluid disjunctive or OR-gate valve (**42**) having a fluid output connection (**47**) connected to and controlling the operating brake (**10**);



an operating brake fluid connecting (**41**) from a first output of the electrically controllable magnetic valve (**36**) to a first input of the fluid disjunctive or OR-gate valve (**42**);

a stop brake fluid pressure connection (**43, 44, 46, 46*b***) from a second output of the electrically controllable magnetic valve (**36**) to the fast-stop brake (**11**); and

a further branch connection (**46*a***) from said second output of the electrically controlled magnetic valve (**36**) to a second input of the fluid disjunctive or OR-gate valve (**42**),

to provide

(a) for normal operation, controlled fluid pressure to the operating brake (**10**) via the first input of the OR-gate valve (**42**), and

(b) under fast-stop conditions or emergency conditions, controlled fluid pressure to the fast-stop brake (**11**) via the fast-stop brake fluid pressure connection and further to the operating brake (**10**) via said further branch connection (**46, 46*a***) to the OR-gate valve (**42**).

4,709,873

DEVICE FOR POSITIONING A TAPE THREADER PIN IN A TAKE-UP REEL

David E. Smith, Lafayette; Dennis R. Olmsted, and Joseph A. Fryberger, both of Longmont, all of Colo., assignors to Aspen Peripherals, Longmont, Colo.

Filed Jun. 11, 1986, Ser. No. 872,952

Int. Cl.[4] G11B *15/66, 23/04;* **G03B** *1/56*

U.S. Cl. 242—195 **7 Claims**

1. A mechanism for positioning a tape threader pin at the axis of rotation of a tape take-up reel adapted to receive said tape threader pin in association with a tape leader block, said mechanism comprising:

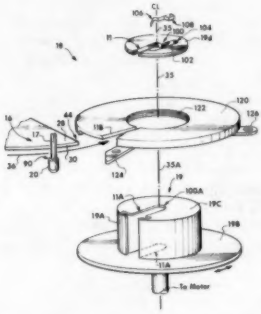
a plate having a receiver slot which extends from an outer edge of the plate to a point beyond the axis of rotation of the take-up reel and a biasing means housing cavity having an open region in front of the axis of rotation of the take-up reel, said biasing means housing cavity being of sufficient size to receive a biasing means depressed into the housing cavity by the threader pin as it enters and leaves the receiver slot; and

a biasing means having a raised region which projects from the biasing means housing cavity into the receiver slot at a position in front of the axis of rotation of the take-up reel, said biasing means further comprising means for keeping the biasing means in said housing cavity.

6. A tape take-up reel mechanism which positions a tape threader pin at the take-up reel's axis of rotation, said mechanism comprising:

a powered take-up reel having a generally cylindrical hub about which a tape is wound, said hub further comprising a hollow region which extends into the hub past the take-up reel's axis of rotation and which is of sufficient size to receive the threader pin and an associated leader block;

a first circular plate having a circular center hole and which is concentrically mounted with the take-up reel's axis of rotation and wherein the first circular plate is provided with a first receiver slot running radially from the circumference of the first circular plate to its circular center hole;



a second circular plate which fits into the center hole of the first circular plate, said second circular plate further comprising (1) a second receiver slot which is aligned with the first receiver slot of the first circular plate and which extends radially from the circumference of the second circular plate to a point beyond the axis of rotation of the take-up reel and (2) a spring housing slot which lies parallel to and partially contiguous with the second receiver slot such that an open region is created between the two slots in front of the axis of rotation of the take-up reel, and wherein said spring housing slot is also of sufficient size to receive a leaf spring when it is depressed into the spring housing slot by the threader pin as it enters and leaves the second receiver slot; and

a leaf spring having a raised center region which is biased from the spring housing slot into the second receiver slot in front of the axis of rotation of the take-up reel, and wherein said spring being is further provided with a keeper which can be wedged into said spring housing slot.

4,709,874

CLUTCH MECHANISM FOR A FISHING REEL

Hideo Murakami, Hiroshima, Japan, assignor to Ryobi, Ltd., Fuchu, Japan

Filed Feb. 14, 1986, Ser. No. 829,501

Claims priority, application Japan, Feb. 15, 1985, 60-21051

Int. Cl.[4] A01K *89/02*

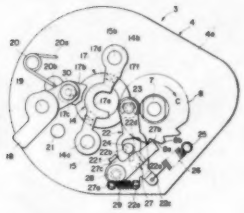
U.S. Cl. 242—220 **5 Claims**

1. A clutch mechanism for a fishing reel comprising:

frame means for supporting components of said reel in an operative arrangement;

a spool for storing and dispensing fishing line therefrom, said spool being rotatable held by said frame means;

means for driving said spool;
a spool shaft connected to and rotatable with said spool;
a pinion gear;
control means for selectively engaging said pinion gear to drive said spool, said control means including an actuating lever and cam means connected to said actuating lever, said cam means being rotatably mounted on said frame means for rotating with respect to said pinion gear to engage and disengage said pinion gear and said spool shaft;
first spring means urging said cam means to a position where said pinion gear is engaged with said spool shaft;
an elongated intermediate link having a first end pivotally connected to said cam means and a second end at an extremity of said link substantially opposite said first end, said link including an opening having a stepped portion and an elongated portion;
means for pivotally connecting said first end of said link to said cam means;
said frame means including a frame projection extending within said opening and disposed to limit movement of



said link when said projection is engaged with said stepped portion of said opening, said stepped portion being engaged with said projection when said pinion gear is disengaged from said spool shaft;
second spring means connected between said link and said frame means for biasing said stepped portion of said link into engagement with said projection;
a kick pawl pivotally affixed to said second end of said link, said kick pawl having a tip portion spaced from said second end;
means for pivotally affixing said kick pawl to said second end of said link;
a circular ratchet member connected top said drive means and having a plurality of teeth disposed on an outer peripheral edge thereof;
third spring means connected between said kick pawl and said link for biasing said tip portion toward said ratchet member, said tip portion being disposed to lie between said teeth when said pinion gear is disengaged from said spool shaft; and
means on said link for limiting the extent of movement of said tip portion toward said ratchet.

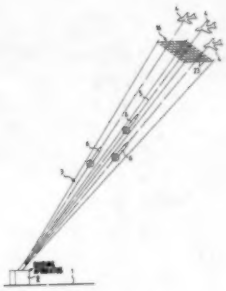
4,709,875

APPARATUS FOR GUIDING A MISSILE

Gregor Cremosnik, Regensdorf; Joachim Timper, Zürich, and Johann Holzberger, Schöfflisdorf, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zürich, Switzerland

Filed Jan. 22, 1987, Ser. No. 5,697
Claims priority, application Switzerland, Jan. 30, 1986, 00349/86
Int. Cl.[4] F41G *7/26*
U.S. Cl. 244—3.13 **20 Claims**

1. An apparatus for guiding a missile, comprising:
means for generating an electromagnetic guide beam guiding the missile along a trajectory leading to a target;
encoding means for encoding in said guide beam generated by said guide beam generating means, data required for guiding said missile along the trajectory leading to the target;
deflecting means for incrementally deflecting said encoded guide beam through a predetermined number of field sectors of a predetermined scanning field;
a computer; and



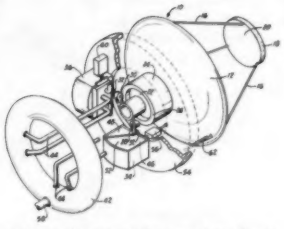
said encoding means and said deflecting means being mutually coupled by means of said computer such as to generate individual codes associated with each one of said predetermined number of sector fields of said predetermined scanning field.

4,709,876

PNEUMATIC MISSILE SEEKER HEAD

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 24, 1985, Ser. No. 726,670
Int. Cl.[4] F42B *15/02*
U.S. Cl. 244—3.16 **6 Claims**



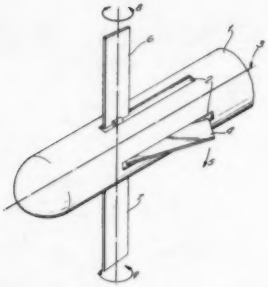
1. A pneumatic seeker head for moving about a rotational axis in response to a command from a control system, the seeker head scanning an area searched by a target detector, the seeker head comprising:
a primary optical element for receiving signal information thereon, the element mounted on a flexible ball joint;
a first pneumatic actuator attached to a mounting plate, the first actuator having a first eccentric means for engaging and rotating the primary optical element on the ball joint; and
a second pneumatic actuator attached to the mounting plate, the second actuator having a second eccentric means for engaging and rotating the primary optical element on the ball joint; and
a high pressure gas source for supplying high pressure gas to the pneumatic actuators.

4,709,877

DEPLOYMENT AND ACTUATION MECHANISMS

Kenneth Goulding, Stevenage, England, assignor to British Aerospace PLC, London, England

Filed Apr. 9, 1986, Ser. No. 849,945
Int. Cl.[4] F42B *15/027*; F16H *1/00*
U.S. Cl. 244—3.28 5 Claims



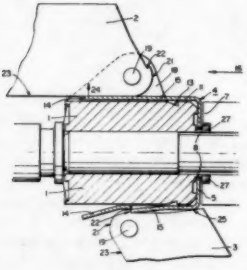
1. A mechanism for erecting a member from an initial stowed position to one of a range of operative positions by turning movement about a first axis, and for then moving the member within said range by turning movement about a second axis arranged at an angle other than zero with respect to said first axis, the mechanism comprising a support structure operable for supporting said member for movement with respect to said support structure, a drive motor connected to said support structure and having a movable output element, means coupling said motor output element to said member and operable whilst said member is at said stowed position and between said stowed and operative positions for translating movement of said motor output element to produce said erection of said member and which becomes operable when said member is erected for translating movement of said motor output element to produce movement of said member within said range of operative positions.

4,709,878

FIN ASSEMBLY DEPLOYMENT SPRING

Mark C. Titley, Stevenage, United Kingdom, assignor to British Aerospace PLC, London, England

Filed Apr. 10, 1986, Ser. No. 850,166
Int. Cl.[4] F16F *1/00*
U.S. Cl. 244—328 4 Claims



1. In a projectile comprising a body portion, a plurality of fins spaced around the body portion and pivotably connected thereto for radially outward movement from respective stowed positions adjacent said body portion to respective deployed positions in which they extend radially from the body portion, and a fin deployment assembly including a body engaging part engaged with said body portion and a plurality of spring members, supported by the body engaging part and operable for engaging respective ones of said fins and urging movement thereof from the stowed to the deployed position, the improvement comprising

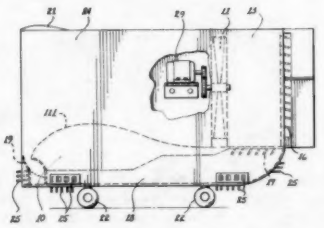
said deployment assembly comprising a one-piece integral member made from a single piece of sheet spring material shaped to define a connecting portion, a plurality of first spring portions defining said body engaging part extending from said connecting portion and operable for gripping said body portion between them for maintaining the member attached to the body portion, and a plurality of second spring portions extending all in the same general direction from said connecting portions and operable for engaging respective ones of said fins and applying radially outward spring forces thereto.

4,709,879

CONTROLLED AIR-FLOW AIRCRAFT CAPABLE OF VERTICAL FLIGHT

Lannon F. Stafford, P.O. Box 27752, Tempe, Ariz. 85282

Continuation of Ser. No. 726,414, Apr. 24, 1985, abandoned. This application Nov. 21, 1986, Ser. No. 935,622
Int. Cl.[4] B64C *23/00*
U.S. Cl. 244—12.1 20 Claims



1. An aircraft capable of hovering and vertical flight comprising:

an airfoil;

a propulsion unit causing forced air flow over said airfoil;

an air chamber coupled to said propulsion unit, said propulsion unit causing air from said forced air flow to enter said chamber;

at least one passage for releasing air in said chamber along a forward portion of said airfoil; and

side members coupled to said airfoil, said side members positioned to confine said forced air flow over said airfoil, said side members extending at least from said propulsion unit to said forward airfoil portion, said propulsion unit and said side members controlling a flow of air over said airfoil, said forced air flow causing a lifting force capable of providing said hovering and vertical flight.

4,709,880

METHOD AND SYSTEM FOR IMPROVED V/STOL AIRCRAFT PERFORMANCE

Ganey W. Bradfield, Fort Worth, and Glynn P. Cragin, Jr., Irving, both of Tex., assignors to General Dynamics Corporation, Fort Worth, Tex.

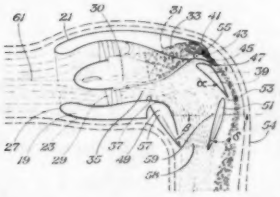
Continuation-in-part of Ser. No. 974,589, Dec. 29, 1978, Pat. No. 4,301,980, and a continuation-in-part of Ser. No. 296,710, Aug. 27, 1981, Pat. No. 4,505,443. This application Dec. 20, 1984, Ser. No. 684,209
The portion of the term of this patent subsequent to Nov. 24, 1998, has been disclaimed.
Int. Cl.[4] B64C *15/02*
U.S. Cl. 244—12.5 23 Claims

1. In a V/STOL airplane in which a higher than ambient pressure, including both static and dynamic pressure, flow of exhaust gas from a power means is turned to effect the change

between flight modes respectively having greater horizontal and greater vertical thrust factors, the mode of improving airplane flight characteristic which comprises:

a. directing a major portion of said exhaust gas flow through a closed conduit means to exit through a thrust-producing primary nozzle that includes a nozzle exit plane at the end of a converging nozzle section and includes turning means downstream of the power means and within a superatmospheric region of higher than ambient pressure extending from immediately downstream of the power means to said nozzle exit plane,

b. turning the exhaust flow via said thrust producing primary nozzle including turning means to an angle from a condition in which the exhaust flow is directed predominantly



horizontally to a condition in which the exhaust flow is directed predominantly downwardly, thereby forming a bend;

c. bleeding off through at least one secondary nozzle a second portion of the exhaust flow from an outer portion of the bend downstream of the bend leading edge to reduce vortex formation in said bend;

d. directing the bleed-off exhaust flows adjacent each other and oriented in the same direction in all flight modes for recovery of the thrust potential in all flight modes;

whereby maximum thrust is effected in all flight modes by eliminating contra-rotating vortics and achieving high efficiency in the exhaust and turn of the exhaust gas from the power means in a superatmospheric region and by recovering the thrust potential of the bled-off portion.

4,709,881

SAFETY LOWERING OR DESCENT PARACHUTE SYSTEM FOR DISABLED HELICOPTERS AND OTHER SIMILAR TYPES OF HOVERING AIRCRAFT

Faraz Rafikian, 9529 Treyford Ter., Gaithersburg, Md. 20879 (by Faraz Rafikian, executor), and Manoucher Rafikian, deceased, late of Gaithersburg, Md., assignors to Faraz Rafikian, Rockville, Md.

Filed Jul. 9, 1986, Ser. No. 883,685
Int. Cl.[4] B64D *17/42*
U.S. Cl. 244—17.15 **20 Claims**

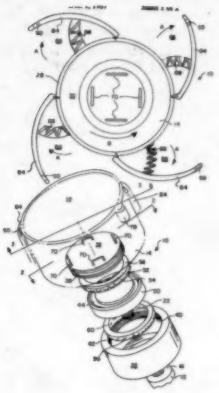
1. A safety lowering or descent system for rotor aircraft, comprising:

a rotor hub assembly;

a parachute housing mounted atop said rotor hub assembly for housing a safety lowering or descent parachute for said aircraft under aircraft disabled conditions;

ball bearing means interposed between said rotor hub assembly and said parachute housing for rotationally isolating said parachute housing from said rotor hub assembly under normal operating conditions; and

means movably mounted upon said parachute housing, between a first stowed position and a second operative position, and operative in conjunction with deployment of said parachute under said aircraft disabled conditions, for substantially reducing rotation of said parachute housing as induced by said rotor hub assembly through said ball



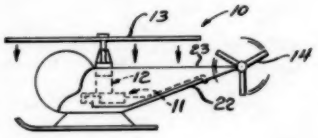
bearing means under weight load support conditions of said aircraft by said safety lowering or descent parachute.

4,709,882

ELECTRIC PROPULSION SYSTEM FOR AIRCRAFT

Andrew D. Galbraith, Los Altos, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Nov. 25, 1983, Ser. No. 555,203
Int. Cl.[4] B64D *27/24*
U.S. Cl. 244—53 R **14 Claims**



1. In an aircraft having a blade to be rotatively driven in effecting powered flight of the aircraft, an improved power supply system for driving said blade comprising:

electric motor means for rotatively driving said blade;

electrochemical power system means for generating electrical power to operate said motor means, said electrochemical power system means including a lithium/peroxide fuel cell utilizing an aqueous electrolyte at a desired molarity; and

means for maintaining said desired molarity of said electrolyte, said molarity maintaining means including means for circulating said electrolyte from said electrochemical power system means through separate heat transfer means for cooling thereof so as to effect precipitation of lithium-hydroxide monohydrate, said molarity maintaining means also including means for collecting said precipitated lithium-hydroxide monohydrate.

4,709,883

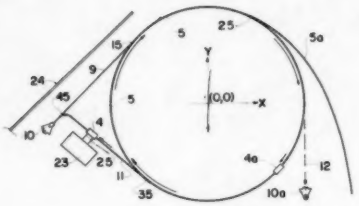
LAUNCH AND ASCENT SYSTEM

Robert L. Giuliani, 1456 Thurston Ave. A-1204, Honolulu, Hi. 96822; Mark A. Giuliani, and Karen A. Giuliani, both of 45-310 Akimala Pl., Kaneohe, Hi. 96744

Filed Apr. 22, 1985, Ser. No. 726,152

Int. Cl.[4] B64F *1/04*

U.S. Cl. 244—63 **6 Claims**



1. An apparatus for launching a vehicle, the combination comprising:

a guideway, the guideway including a curve along at least a portion of its length;

a load, the load comprising a first vehicle and at least one additional vehicle;

a magnetic force field between the first vehicle and the guideway for propulsion of the load along the guideway, the propulsion including an acceleration of the load;

a relatively shallow bank of the guideway along the curve toward the inside thereof for providing centripetal force to the load at lower velocities;

a releasable engagement between the first vehicle and the additional vehicle, the engagement permitting a variable tilt therebetween; the tilt restricted essentially toward the inside of the curve transverse to a tangent thereof during at least a part of the propulsion;

the additional vehicle characterized by aerodynamic lift surfaces thereupon; and

the tilt of the additional vehicle effecting centripetal force thereupon by the aerodynamic lift at higher velocities wherein the load is accelerated to a velocity for releasing the engagement to launch the additional vehicle.

4,709,884

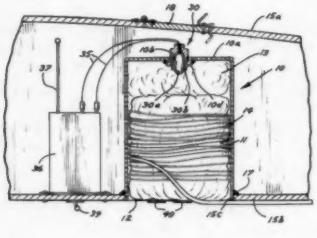
PARACHUTE APPARATUS FOR MODEL AIRPLANE

Troy C. Gustafson, 9913 Dellridge Rd., Bloomington, Minn. 55420

Filed Jan. 16, 1987, Ser. No. 4,027

Int. Cl.[4] B64D *17/72*

U.S. Cl. 244—139 **7 Claims**



1. An apparatus controlling the descent of an airborne model airplane, having in combination

an opening in the bottom wall of the fuselage of a model airplane,

a container disposed into said opening,

said container having an open bottom,

a parachute packed into said container through said opening,

means connecting said parachute and said airplane,

a hatch in the top wall of said fuselage for access to the top wall of said container,

a parachute ejecting cartridge,

means positioning said cartridge into said top wall of said container, and

means activating said cartridge to eject said parachute downwardly of said airplane.

4,709,885

PARACHUTE SYSTEM AND AIRCRAFT EJECTION SEAT INCORPORATING THE SAME

James W. Martin, Beaconsfield, England, assignor to Engineering Patents & Equipment Limited, St. Peter, Channel Islands

Filed Nov. 7, 1985, Ser. No. 796,100

Claims priority, application United Kingdom, Nov. 22, 1984, 8429508

Int. Cl.[4] B64D *25/10*

U.S. Cl. 244—141 **4 Claims**

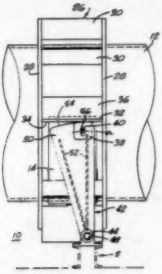
1. A parachute system for an airman ejected from an aircraft in an ejection seat, including at least one drogue parachute, a rigid hollow container housing said drogue parachute, connecting means at least temporarily connecting said drogue parachute with said ejection seat, said connecting means including line means and a closure fitted to said container, said line means including a first line connected to said drogue parachute and a second line at least temporarily connected to said ejection seat, with said closure connecting said first and second lines, said container, with said drogue parachute and with said closure, being formed as a projectile, the system including a projection device for mounting on an ejection seat, means mounting said projectile in said projection device, said projection device being operable to propel the projectile from said projection device along a predetermined trajectory, said container having a trailing end which faces in the direction opposite to that along which, in operation, the container is moved along said trajectory by the projection device and which trailing end is closed by said closure, whereby when said container is projected from the projecting device, the container remains closed, with said closure in position, until said second line becomes taut, arresting said closure whilst allowing the container and said drogue parachute to proceed along said trajectory and opening the container to allow the drogue parachute to be drawn from the container when the first line becomes taut and the momentum imparted to the container by the projection device carries the container further along said trajectory, and wherein after projection of the rigid container from the projection device there is no positive connection between the container and any component still connected with the seat or said drogue parachute so that after the drogue parachute has left said container, the container is completely free from the other components.

4,709,886

HIGH TEMPERATURE PIPE AND DUCT SUPPORT

Leonard G. Smart, Monrovia, and Henry T. Hui, Arcadia, both of Calif., assignors to CF Braun & Company, Alhambra, Calif.

Filed Feb. 13, 1986, Ser. No. 829,446
Int. Cl.[4] F16L 3/16
U.S. Cl. 248—49 6 Claims



6. A pipe and duct support apparatus comprising:

a frame positioned to circumscribe the pipe or duct, said frame having cam following surfaces and slotted tabs positioned adjacent said cam following surfaces, extending perpendicularly thereto;

a cradle comprising a strap member of a ductile material attached to the pipe or duct said strap member having sufficient thickness to provide lateral and vertical support for the pipe or duct, said cradle being pivotally attached to side portions of said frame and suspended therebetween and having surface contact with the pipe or duct such that the temperature of the cradle is similar to that of the pipe or duct;

rocker arms pivotally secured to a support surface for supporting said frame, said rocker arms including cammed surfaces for engagement with the cam following surfaces on said frame and further including detents positioned adjacent said cammed surfaces, extending perpendicularly thereto for engagement in the slotted tabs of said frame; and

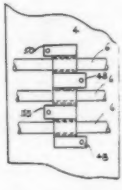
a keel member attached to said cradle extending perpendicularly from the surface thereof, said keel member being slidably mounted on a support surface.

4,709,887

HIGHWAY CABLE CLAMP

Nicola Bongiovanni, 320 Dixon Road, Apartment 1810, Weston, Ontario, Canada M9R 1S8, and Vincent Cianfarani, 45 Marylin Street P.O. General Delivery, Caledon East, Ontario, Canada LON 1EO

Filed Sep. 15, 1986, Ser. No. 907,076
Int. Cl.[4] F16L 3/08
U.S. Cl. 248—66 11 Claims



4. A clamp for supporting a plurality of horizontally spaced highway guard cables against a wooden post having a vertical split, said clamp comprising; a plate member presenting flat portions and a plurality of U-shaped spaced apart recess means adapted to freely slidingly retain said plurality of cables, respectively, against said post, said flat portions including a series of aperture means staggered along two vertical opposing edges thereof, said aperture means adapted to receive nails to be driven into said wooden post for fastening said clamp to said post, said clamp adapted to be disposed adjacent said split so that said clamp and said staggered series of aperture means along said opposing edges of said flat portions straddle said split and improve the strength characteristics of said wooden posts.

4,709,888

HANGER APPARATUS FOR ELECTRICAL CONDUIT AND THE LIKE

Harry T. Cubit, Lansdale, and George C. Johnson, Norristown, both of Pa., assignors to T. J. Cope, Inc., Collegeville, Pa.

Filed Oct. 1, 1985, Ser. No. 782,659
Int. Cl.[4] F16L 3/03
U.S. Cl. 248—73 16 Claims

1. Hanger apparatus for suspending elongated members from supporting structures, comprising: a strap member having respective opposite faces thereof and adapted to be coupled to a supporting structure, said strap member having a series of longitudinally spaced openings therein; a first load support coupled to and supported by said strap member in association with one face thereof, said load support having a hook member thereon, an opening therein spaced from said hook member by a distance corresponding to the spacing between said openings in said strap member, and a projection thereon extending the direction of said hook member and spaced from said hook member by a distance corresponding to the spacing between said openings in said strap member; and a second load support coupled to and supported by said strap member in association with the other face thereof and having a hook member thereon, said hook member of said second load support extending through one of said openings in said strap member and said opening in said first load support, whereby said hook member of said second load support operatively interconnects said load supports and said strap member.

4,709,889

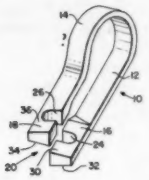
WIRE CLIP

David A. Erickson, Hinsdale, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Aug. 27, 1986, Ser. No. 900,806
Int. Cl.[4] F16L 3/08
U.S. Cl. 248—74.5 1 Claim

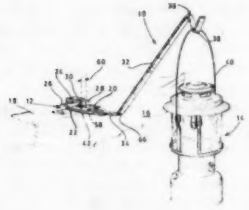
1. A wire clip comprising an elongate flexible strip having a longitudinal axis, a first end and a second end, said strip being formed to provide a loop-shaped wire retaining portion and having attachment means for attaching said clip to a workpiece in an installed position; said attachment means comprising first and second wedge-shaped blocks integrally formed respectively in said first and second ends, there being first and second U-shaped slots respectively formed through said first and second wedge-shaped blocks with a bight near a thinner end of each of said blocks and with a channel leading from each of said bights to the respective thicker ends of each of said blocks,

the axis of each of said slots being substantially perpendicular to said longitudinal axis, and a pin means for compressively attaching said clip in said installed position; said attachment means being configured to, in said installed position, present complementary uninterrupted sloping faces, from said thicker ends to said thinner ends, in slidable engagement between said



first and second wedge-shaped blocks, said first and second U-shaped slots opening toward each other, whereby application of a compressive force by said pin means in installing said clip effects a contineous sliding wedge action between said first and second wedge-shaped blocks urging said bights of said first and second slots against said pin means.

4,709,890
LANTERN HOLDER
Carl F. Moore, 4417 Mellowood Cir., Knoxville, Tenn. 37920
Filed Sep. 8, 1986, Ser. No. 904,209
Int. Cl.[4] A47B *96/00*
U.S. Cl. 248—205.1 **20 Claims**

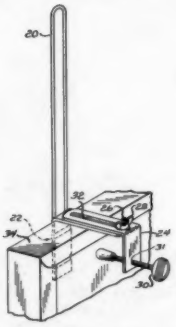


1. A lantern holder for releasably supporting a lantern and for releasably engaging and being supported by a cleat mounted on a supporting surface, said cleat comprising a base portion for mounting said cleat on said supporting surface, an upper portion defining a pair of oppositely disposed horizontally projecting arms, and a bottom surface and a rear side surface oppositely disposed from a side surface toward said lantern, and a waist portion joining said base portion and said upper portion, said lantern holder comprising:

an elongated support arm defining a first end portion and a further distal end portion, said distal end portion being provided with means for releasably engaging and supporting said lantern; and

cleat engaging means fixedly carried by said first end portion of said support arm for releasably engaging said cleat, said cleat engaging means comprising at least one shank portion having a lower surface for being received under and releasably engaging said bottom surface of said upper portion of said cleat, said shank portion defining a first end portion extending from said first end portion of said support arm and a second end portion provided with an upstanding retainer means for engaging said rear side surface of said upper portion of said cleat whereby weight of said lantern engaged with said distal end portion of said support arm causes said support arm to be biased downwardly such that said lower surface of said shank portion contacts said supporting surface and said shank portion and said retainer means are releasably engaged with said upper portion of said cleat.

4,709,891
SUPPORT BRACKET FOR SIGNS AND ADVERTISING DISPLAYS
Earl D. Barnett, Morton Grove, Ill., assignor to Chicago Show Printing Co., Morton Grove, Ill.
Filed Jan. 2, 1986, Ser. No. 815,540
Int. Cl.[4] G09F *3/18*
U.S. Cl. 248—214 **1 Claim**



1. A support bracket arrangement for securing signs and advertising displays to a vertically disposed shelf gondola comprising:

an adjustable clamp for securing the bracket to the gondola, said adjustable clamp comprising one L-shaped member secured over a second L-shaped member by a screw and wing nut combination with one of said L-shaped members having a slot to permit adjustment of the clamp to receive different sized gondolas, one of said one L-shaped members including a set screw positioned in a thread hole for engaging the gondola to secure the clamp thereagainst;

a verticaly extending support for securing a sign thereon, said support comprising an inverted U-shaped wire loop which extends vertically along its entire length above the gondola and is attached at its ends to the other of said L-shaped member;

a backing member attachable to a sign or display, said backing member comprising a channel having an inverted U-shaped portion dimensioned to snugly but slidably receive said inverted U-shaped wire loop such that said inverted U-shaped wire loop mateably engages said channel along said inverted U-shaped portion;

whereby a sign attached to said backing member can be supported for display above said gondola at a predetermined height by the engagement of said inverted U-shaped portion of said channel with said inverted U-shaped wire loop.

4,709,892
ADJUSTABLE SUPPORT FOR BOOKSHELVES
Merce B. Gurgui, C. Consell de Cent, 83, 08015 Barcelona, Spain
Filed Jul. 9, 1986, Ser. No. 883,702
Claims priority, application Spain, Jul. 11, 1985, 288.009
Int. Cl.[4] A47B *57/04*
U.S. Cl. 248—250 **14 Claims**

1. Adjustable support for a bookshelf, comprising

a first clamping member having a first clamping surface,

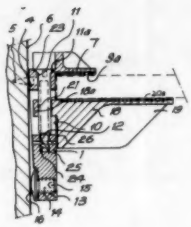
means for fixing said first clamping member to a stationary mounting,

said first clamping member comprising a passageway,

a threaded member rotatably mounted in said first clamping

member and including a portion which extends into said passageway, and

a second clamping member coupled to said first clamping member and having a second clamping surface in spaced opposed relationship to said first clamping surface, said second clamping member being threadedly mounted upon said threaded member,



said threaded member comprising means for moving said second clamping surface towards or away from said first clamping surface upon rotation of said threaded member in one or another direction respectively,

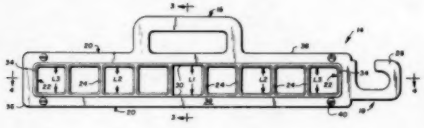
whereby rotation of said threaded member causes the spacing between said first and second clamping members to smoothly vary.

4,709,893

STRESS BRACE

Robert Ljungberg, 373 Cottonwood Dr., Williamville, N.Y. 14221

Filed Sep. 26, 1986, Ser. No. 912,004
Int. Cl.[4] A47G *29/00*
U.S. Cl. 248—360 **19 Claims**



1. A brace member for holding an article comprising:

two, spaced apart side, beam support members, said side beam members having end and central portions with at least part of the central portions being spaced apart a first distance and the end portions being spaced apart a second distance different from said first distance;

means for spanning between said side beam members to establish and maintain the spaced apart relationship thereof; and

means for maintaining edges of said article in contact with said side support members.

4,709,894

SLIP CONNECTOR FOR WEIGHT ACTUATED HEIGHT ADJUSTORS

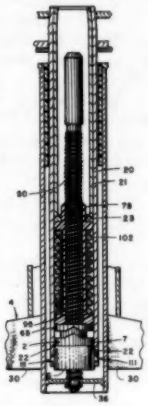
Glenn A. Knoblock, Kentwood, and Brian L. Scolten, Jenison, both of Mich., assignors to Steelcase Inc., Grand Rapids, Mich.

Filed Apr. 10, 1986, Ser. No. 850,510
Int. Cl.[4] F16M *11/24*
U.S. Cl. 248—406.2 **30 Claims**

1. In seating of the type having a base, a seat rotatably supported thereon, and a weight actuated height adjustor which is engaged when said seating is unoccupied to raise and lower the height of said seat in response to rotation of said seat with respect to said base, and is disengaged when said seating is occupied to permit said seat to swivel with respect to said base without affecting the height of said seat, the improvement of a slip connector to alleviate unintentional height adjustment; said slip connector comprising:

first and second coupling members positioned for mutual rotation about a common axis; said first coupling member being operably connected with said seat for rotation therewith, and said second coupling member being operably connected with said height adjustor, such that rotation of said seat with respect to said base is transmitted to said height adjustor through said slip connector;

means for positively interconnecting said first and second coupling members when said seat is unoccupied and when



said first and second coupling members assume a first, selected angular relationship to rotate said first and second coupling members together about said axis;

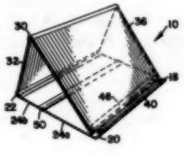
means for rotatably biasing said first and second coupling members when said seating is occupied into a second, selected angular relationship which is spaced a preselected angular measure from said first selected angular relationship, whereby when the user exits said seating, said seat must be rotated through said preselected angular measure with respect to said base before said positive interconnecting means engages and seat rotation is transmitted to said height adjustor, thereby alleviating unintentional height adjustment.

4,709,895

PORTABLE VIEWING STAND

Keith R. Mardak, Elm Grove, Wis., assignor to Hal Leonard Publishing Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 829,769, Feb. 14, 1986, abandoned. This application Jan. 30, 1987, Ser. No. 9,574
Int. Cl.[4] A47B *97/04*
U.S. Cl. 248—460 **5 Claims**



1. A portable collapsible apparatus for supporting an article to be viewed by an individual without the need for the viewing

individual to support the article by hand, said apparatus comprising;

a first rigid panel (12') having a rear edge (16') and a forward edge (15');

a second rigid panel (13') having first and second spaced apart edges (18', 19'), said, second panel (13') disposed adjacent said first panel (12') with said first edge (18') of said second panel generally parallel to and spaced from said rear edge (16');

a third rigid panel (14'), having first and second spaced apart edges (20', 21'), said third panel (14') disposed adjacent said second panel (13') with said first edge (20') of said third panel generally parallel to and spaced from said second edge (19') of said second panel;

a first sheet (25') of flexible material disposed covering first sides of said first, second and third panels;

a second sheet (27') of flexible material disposed covering second sides of said first, second and third panels;

said first and second sheets (25', 27') each sized to extend beyond peripheral edges of said panels with peripheral edges (25a', 27a') of said sheets opposing one another;

a portion of said first sheet (25') opposing a portion of said second sheet (27') between opposing edges (16', 18') of said first and second panels (12', 13') to define a first hinge area (30');

a portion of said first sheet (25') opposing a portion of said second sheet (27') between opposing edges (19', 20') of said second and third panels (13', 14') to define a second hinge area (32');

a seal formed joining opposing peripheral edges (25a', 27a') of said sheets (25', 27') to define an enclosed volume between said sheets with said panels (12',13', 14') disposed within said enclosed volume;

a first flexible hinge seal (34') formed joining opposing sheet portions in said first hinge area (30');

a second flexible hinge seal (36') formed joining opposing sheet portions in said second hinge area (32');

said first and second hinge seals dividing said enclosed volume into first, second and third pockets containing said first, second and third panels, respectively, said hinge seals accommodating pivotal movement of adjacent panels about pivot axes generally parallel to opposing edges of said panels;

a stop (40') secured to one of said sheets and protruding above said first panel (12') and adjacent said forward edge (15') of said first panel, said stop disposed to abut said second edge (21') of said third panel (14') when said panels are pivoted about said hinge areas to generally assume a shape of a triangular prism with said third panel projecting upwardly and away from said stop, and said stop (40') including a first retaining surface (44') extending upwardly from said first panel (12') and away from said forward edge (15'), said stop further including a second retaining surface (46') extending upwardly from said first panel (12') and toward said forward edge (15').

4,709,896

IN-SEAT SUSPENSION

Robert Wahls, Leclaire, Iowa, and Dennis Gryp, Silvis, Ill., assignors to Sears Manufacturing Co., Davenport, Iowa

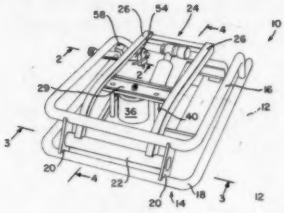
Filed Oct. 30, 1985, Ser. No. 793,084
Int. Cl.[4] A47C *3/00*
U.S. Cl. 248—550 **11 Claims**

1. A vehicle seat suspension apparatus, comprising:

a frame including rigidly connected upper and lower structural members;

a platform contained within the frame and hinged at one end to a side of the frame to allow limited rotation of the platform in a generally vertical arc contained within the frame; and

means attached between the frame and platform and contained within the frame for resiliently biasing the platform



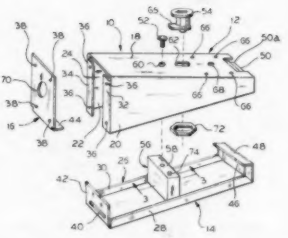
within the frame in response to a force exerted on the platform.

4,709,897

SURVEILLANCE CAMERA MOUNT

Paul C. Mooney, Northbrook, Ill., assignor to Quick-Set, Incorporated, Northbrook, Ill.

Filed Jul. 30, 1986, Ser. No. 890,469
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—551 **21 Claims**



1. A surveillance camera mount, comprising:

a bracket adapted to be permanently secured to a mounting surface, said bracket defining a portion of a hollow housing having a surface adapted to support a surveillance camera and an opening disposed to face opposite said camera supporting surface, and including means for permanently mounting said bracket to said mounting surface;

a base conforming to said opening in said bracket, said base defining the remainder of said hollow housing and having a flange extending substantially about the perimeter thereof with at least a portion adapted to be disposed internally of said bracket when said base is secured to said bracket, and including means for securing said base to said bracket;

said base securing means including first securing means operatively associated with said base and said bracket adjacent said mounting surface and second securing means operatively associated with said base and said bracket at a point remote from said mounting surface; and

means for locking said base to said bracket in a tamper-proof manner;

said first and second securing means and said bracket mounting means being concealed by said base when said base is locked to said bracket by said base locking means.

4,709,898

FLUID-SEALED ENGINE MOUNTING

Hiroshi Yoshida; Takefumi Toyoshima, both of Saitama; Tomio Iwabori; Hideaki Ohkura, both of Kanagawa; Yasuo Miyamoto; Izumi Nishimura, both of Saitama; Toshiyuki Oikawa, Kanagawa; Kenji Sekijima, Kanagawa, and Makoto Ohashi, all of Japan, assignors to Hokushin Kogyo Kabushiki Kaisha, Kanagawa, Japan

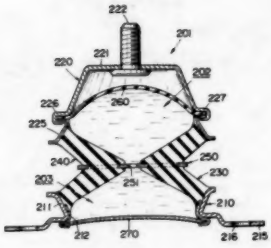
Division of Ser. No. 633,324, Jul. 7, 1984, Pat. No. 4,573,656. This application Oct. 4, 1985, Ser. No. 784,024

Claims priority, application Japan, Jul. 22, 1983, 58-134826; Feb. 20, 1984, 59-23573

The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.

Int. Cl.[4] F16M *13/00*

U.S. Cl. 248—562 3 Claims



1. A fluid-sealed engine mounting for mounting an engine on a vehicle frame, comprising:

(a) a connector adapted to be connected to the engine;

(b) a base adapted to be connected to the vehicle frame;

(c) an elastic member joined between said connector and said base and elastically deformable in response to vibrations transmitted thereto, said connector, said base and said elastic member jointly defining a fluid chamber in which a fluid is sealed;

(d) a partition intermediate said connector and said base and dividing said fluid chamber into a first chamber adjacent to said connector and a second chamber adjacent to said base, said partition having an orifice through which said first and said second chambers communicated with each other; and

(e) a diaphragm mounted in said connector for maintaining the pressure in said first chamber substantially constant when vibrations are transmitted to the engine mounting, said base comprises a frustoconical tubular body mounted on an end of said elastic member and having a radially outwardly projecting flange on one end thereof remotely from said connector for attachement to the vehicle frame, said fluid chamber being between said radially outwardly projecting flange and said connector.

3. A fluid-sealed engine mounting according to claim 2, wherein said base further comprises a ring attached on to the inner side of said frustoconical tubular body, and said rigid member is connected to said ring through caulking of said ring.

4,709,899

CLIMBING FORMWORK APPARATUS FOR CONCRETE PLACING

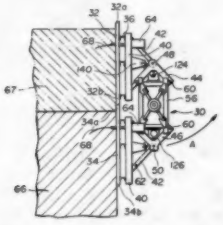
Yasuo Kajioka; Tomio Komine; Hitoshi Kadowaki; Shigeyoshi Matsuda; Yoshinori Yugami; Shinya Kubota; Yoshio Takahashi; Hiroshi Shimada, and Nobutaka Kurata, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Oct. 27, 1986, Ser. No. 923,428

Claims priority, application Japan, Oct. 28, 1985, 60-241050; May 10, 1986, 61-106956; May 15, 1986, 61-111615; May 15, 1986, 61-111616; May 27, 1986, 61-121706; May 27, 1986, 61-80111[U]; Sep. 16, 1986, 61-141501[U]

Int. Cl.[4] E04G *11/28*

U.S. Cl. 249—20 25 Claims



1. A formwork apparatus for concrete placing comprising:

a center frame assembly having upper and lower ends;

first and second form panels for molding concrete walls, each having a supporting member mounted on an outer surface thereof, the first form panel pivotally connected at the supporting member thereof to the upper end of the frame assembly so as to be pivoted about a substantially horizontal axis, the second form panel pivotally connected at the supporting member thereof to the lower end of the frame assembly so as to be pivoted about an axis parallel to a pivot connecting the first panel with the frame assembly;

first fixing means for fixing and releasing the first panel to and from a concrete wall;

second fixing means for fixing and releasing the second panel to and from the concrete wall;

first drive means for pivoting the frame assembly around the first panel when the first panel is fixed to the concrete wall so that the second panel is lifted to a position upper side of the first panel; and

second drive means for pivoting the frame assembly around the second panel when the second panel is fixed to the concrete wall so that the first panel is lifted to a position upper side of the second panel.

4,709,900

CHOKE VALVE ESPECIALLY USED IN OIL AND GAS WELLS

Einar Dyhr, Skodsborgvej 160, DK-2840 Holte, Denmark

Filed Mar. 20, 1986, Ser. No. 841,564

Claims priority, application Denmark, Apr. 11, 1985, 1628/85

Int. Cl.[4] F16K *31/122*

U.S. Cl. 251—5 10 Claims

1. A choke valve comprising:

an inlet at an upstream end thereof;

an outlet at a downstream end thereof;

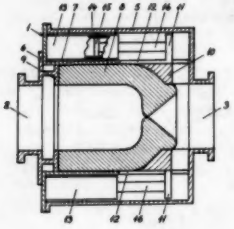
a flexible tubular element between said inlet and said outlet;

a central passage in said flexible tubular element for permitting a flow of a fluid from said inlet to said outlet;

means for deforming a downstream end of said flexible tubular element into a controllable position selectively constricting said central passage; and

said means for deforming further including means for successively deforming additional portions of said flexible tubular element into said controllable position as de-

formed portions at said downstream end of said flexible tubular member are abraded away by said flow of a fluid, whereby an operating lifetime of said choke valve can be



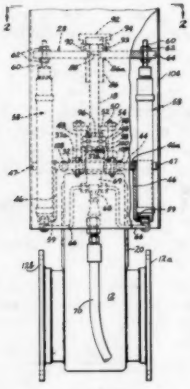
made as long as desired by increasing a length of said flexible tubular element and an operational range of said means for deforming.

4,709,901

FLUID POWER OPERATED SLIDING GATE VALVE SYSTEM FOR TANK TRUCKS, PIPELINES, STORAGE TANKS AND THE LIKE

Karl B. Pierson; Thomas E. Mooney, both of Warren, Pa., and William G. Jones, Frewsburg, N.Y., assignors to Betts Industries, Inc., Warren, Pa.

Filed Apr. 20, 1987, Ser. No. 39,925
Int. Cl.[4] F16K *31/124*
U.S. Cl. 251—58 **19 Claims**



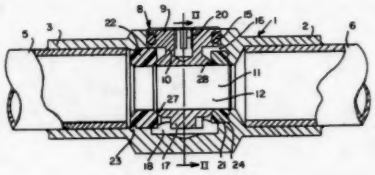
1. Fluid power operated mechanism for controlling actuation of a sliding gate valve or the like, adapted for use in tank trucks, pipelines and the like comprising, spaced supports, one of said supports including means for attaching the operating rod of a sliding gate valve thereto, constant force spring means coacting between said supports and urging the latter toward one another, means for guiding the movement of said one support relative to the other support, and fluid powered reciprocal motor means extending between said supports and when actuated from a source of pressurized fluid, adapted to move one of said supports relative to the other support against the bias of said spring means to cause movement of the gate valve operating rod and thus actuation of the gate valve, said means for guiding said one support including guide posts supported on said other support, and extending outwardly relatives thereto and through openings in said one support, sleeve means generally encompassing the respective siad guide posts and extending between said supports for limiting movement of said one support toward said other support during relative movement between said supports, and said guide posts preventing tilting of said one support relatigve to said other support during relative movement between said supports, said spring means comprises a spool of constant force spring rotatably mounted on said other support with a spring tape thereof being coiled about said spool and then attached at its distal end to said one support, resulting in preloading of said spring tape means a predetermined amount.

4,709,902

BALL VALVE HAVING VALVE HOUSING WITH INTERIOR ANNULAR RIDGE FOR HOLDING ANNULAR RETAINING ELEMENT IN POSITION

Anders N. Hansen, Husby, Denmark, assigaor to Broen Armatur A/S, Assens, Denmark

PCT No. PCT/DK85/00067, § 371 Date Mar. 5, 1986, § 102(e) Date Mar. 5, 1987, PCT Pub. No. WO86/00680, PCT Pub. Date Jan. 30, 1986
PCT Filed Jul. 10, 1985, Ser. No. 845,702
Claims priority, application Denmark, Jul. 11, 1984, 3418/84
Int. Cl.[4] F16K *5/20*
U.S. Cl. 251—315 **3 Claims**



1. A ball valve which comprises

a valve housing which defines opposite first and second hollow branches and an internal recess therebetween, said first hollow branch including ridge means extending interiorly thereof,

an annular sealing element, said annular sealing element being located in said recess adjacent said second hollow branch,

a rotatable valve plug which includes a generally spherical part having a flow passage therethrough, said rotatable valve plug being located in said recess such that said generally spherical part contacts said annular sealing element, and

an annular retaining element which is positioned in said first hollow branch and extends past said ridge means into said recess to apply pressure against the generally cylindrical part of said rotatable valve plug, said annular retaining element being made of a sufficiently resilient material that its outer surface, which is cylindrical in shape when in an unstressed condition, is inwardly deformed by said ridge means and thus held in position against said rotatable valve plug.

4,709,903

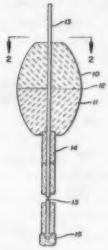
SLAG RETAINING DEVICE FOR USE IN CONVERTERS, LADLES, OR THE LIKE

Micheal D. LaBate, 115 Hazen Ave., Ellwood City, Pa. 16117

Filed May 8, 1986, Ser. No. 860,826
Int. Cl.[4] C21C *5/46*
U.S. Cl. 266—227 **8 Claims**

1. The combination in a vessel for molten metal having a tap hole of a preformed cylindrical refractory sleeve registering with said tap hole and a preformed slag retaining device for selectively engaging said cylindrical refractory sleeve during the drawing off of metal from said vessel, said slag retaining device comprising a closure of a barrel shape having ends and curved sides with a dimension between said ends that is equal to or greater than a maximum dimension between said curved

sides and having a size to effectively close said cylindrical refractory sleeve when engaged therein, said slag retaining device and said cylindrical refractory sleeve being formed of refractory materials resistant to dissolution in the molten metal



and slag for a time sufficient to assure the lodgement of said slag retaining device in said cylindrical refractory sleeve and wherein said slag retaining device has a density of about 0.12 to about 0.22 lbs. per cubic inch so that it will float in said molten metal and below said slag.

4,709,904

VACUUM FURNACE FOR HEAT-TREATING A CHARGE

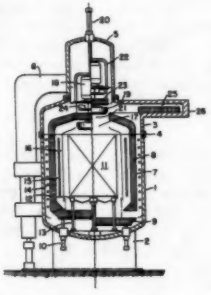
Peter Schmetz, Menden, Fed. Rep. of Germany, assignor to Schmetz GmbH & Co. KG, Menden, Fed. Rep. of Germany

Division of Ser. No. 731,058, May 5, 1985, Pat. No. 4,612,064. This application May 28, 1986, Ser. No. 868,300

Claims priority, application Fed. Rep. of Germany, May 8, 1984, 3416902

Int. Cl.[4] C21D *1/74*

U.S. Cl. 266—250 **3 Claims**



1. A vacuum furnace for heat-treating a charge as rapidly as possible to about 750° C. heat-treating temperature permissible for a circulation device in a first stage and in a second stage the charge is heated by radiation heating to a higher desired end temperature with an overall more rapid and more uniform heating of the charge although the circulation device is protected from effect of higher temperatures in the second stage, comprising:

a steel vessel which can be closed off;

means forming a heating chamber, provided in said vessel, for receiving said charge;

heating elements provided within said heating chamber;

fan assembly means including a fan as the circulation device capable of being disposed in said vessel;

means for movement of the entire fan assembly means projected into an operating position within said vessel only during said first stage and retracted into a rest position externally of said vessel during said second stage so as to remove and protect the fan as the circulation device from effect of higher temperatures in the second stage;

a gas guiding arrangement for gas conveying guided in the manner of a hood disposed in said heating chamber and located axially inside said vessel, with said fan and said gas guiding arrangement during the first stage cooperating to produce a gas circulation internally through said heating chamber; and

means to close off said heating chamber and separate said heating chamber from said fan in rest position during the second stage at the higher temperatures.

4,709,905

CASING ASSEMBLY FOR INJECTING MATERIAL INTO A METALLURGICAL VESSEL

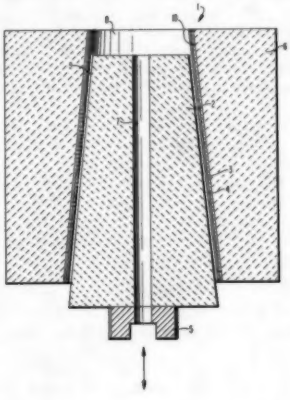
Manfred Winkelmann, Krefeld; Udo Muschner, Tönisvorst, both of Fed. Rep. of Germany, and Pierre Gerber, Hausen, Switzerland, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Apr. 30, 1986, Ser. No. 857,538

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520207

Int. Cl.[4] C21C *5/48*

U.S. Cl. 266—270 **9 Claims**



1. A casing assembly, for use with a metallurgical vessel containing molten material, said casing assembly comprising:

a nozzle brick adapted to form part of a wall of a metallurgical vessel, said nozzle brick having therethrough a conical opening defined by a conical inner surface;

a casing to be inserted into said conical opening and having a truncated conical shape including a conical outer surface;

said conical opening and said casing having coaxial center axes, and said conical inner and outer surfaces extending at equal angles of inclination to said axes; and

said conical inner surface being jacketed with a thin metal shell having a conical shape with the same inclination as said conical inner and outer surfaces;

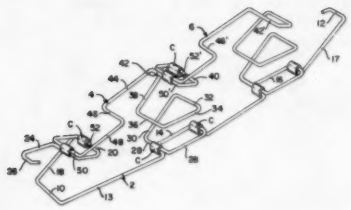
whereby said casing is insertable into said conical opening such that said conical outer surface seats precisely and snugly on said metal shell.

4,709,906

FURNITURE SEAT SUPPORTS AND SPRING ASSEMBLIES

Ned W. Mizelle, P.O. Box 5985, High Point, N.C. 27262

Filed Oct. 14, 1986, Ser. No. 917,863
Int. Cl.[4] F16F *3/00*
U.S. Cl. 267—103 **51 Claims**



1. A furniture spring assembly for forming a resilient seat support on a substantially horizontal seat frame,

said spring assembly including a base spring and at least two upper springs mounted on said base spring,

said base spring formed of a length of wire which has a forward mounting portion which is connectible to a front rail of a seat frame, said base spring also having a rear mounting portion which is connectible to a rear rail of the seat frame, said base spring extending longitudinally from the forward mounting portion to the rear mounting portion and being bent between and below the forward mounting portion and the rear mounting portion to form spaced apart support portions for supporting the upper springs,

a first upper spring having a lower base portion, a resilient vertically collapsible midportion and an upper attachment portion, said lower base portion of the first upper spring being connected to one of the support portions of the base spring,

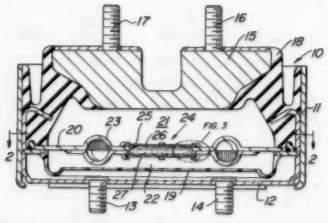
a second upper spring having a lower base portion, a resilient vertically collapsible midportion and an upper attachment portion, said lower base portion of the second upper spring being connected to one of the support portions of the base spring, and means for connecting the upper attachment portion of the first upper spring to the upper attachment portion of the second upper spring.

4,709,907

QUIET FLUID FILLED VIBRATION ISOLATOR

Richard P. Thorn, Lord Corporation, 1635 W. 12th St., Erie, Pa. 16512

Filed Jan. 30, 1986, Ser. No. 824,367
Int. Cl.[4] F16F *15/04*; B60G *15/04*; F16M *13/00*
U.S. Cl. 267—140.1 **17 Claims**



1. In a vibration isolating device having a housing with at least one flexible wall portion movable in response to vibrations imparted thereto, a partition dividing the housing into at least two chambers for containing a working fluid displaceable in response to movement of the flexible wall, an inertia track passageway providing fluid communication between the chambers, and decoupling means cooperable with the inertia track passageway to control fluid flow between the chamers, the improvement wherein said decoupling means comprises passage means providing fluid communication between said chambers, a mass of particulate matter loosely contained in a said passage means, foraminous means between opposite ends of said passage means for confining said particulate matter loosely therein, said particulate matter cooperable with said fluid and said foraminous means to permit fluid to flow substantially freely in said passage means in response to vibrations of a predetermined amplitude while porgressively throttling fluid follow through said passage means in response to vibrations of greater amplitude wherein the density of said particulate matter corresponds substantially to the density of the working fluid which oscillates between the chambers.

6. In a vibration isolating device having a housing with at least one flexible wall portion movable in response to vibrations imparted thereto, a partition dividing the housing into at least two chambers for containing a working fluid displaceable in response to movement of the flexible wall, an inertia track passageway providing fluid communication between the chambers, and decoupling means cooperable with the inertia track passageway to control fluid flow between the chambers, the improvement wherein the decoupling means comprises:

passage means in said partition providing fluid communication between said chambers,

foraminous means provided at spaced locations in said passage means for defining a cavity having a predetermined volume in said passage means,

a mass of particulate matter contained within said cavity and occupying less than said volume when at rest therein, the particles composing said particulate matter having a density corresponding substantially to the density of the working fluid,

said particulate matter being movable in said cavity in response to fluid movement therein between a dispersed condition providing minimum resistance to fluid flow and a compacted condition in engagement with said foraminous means providing maximum resistance to fluid flow,

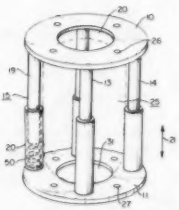
whereby the vibration isolator functions quietly over a range of vibration frequencies and amplitudes.

4,709,908

STABILIZER DEVICE FOR AUTOMOBILE SUSPENSION SYSTEMS

Gerald Joseph, 1275 15th St., Fort Lee, N.J. 07024, and Joseph Berta, 827 Linden Ave., Ridgefield, N.J. 07657

Filed Nov. 22, 1985, Ser. No. 800,957
Int. Cl.[4] F16F *5/00*
U.S. Cl. 267—140.4 **10 Claims**



1. A stabilizer suspension housing for enclosing an elastomeric inflatable bag for use as a suspension assembly in a vehicle, comprising:

top and bottom annular seat members spaced apart, one from another, residing in relatively congruent relationship, each of said members having a central aperture and corresponding extending arms which telescopically engage to

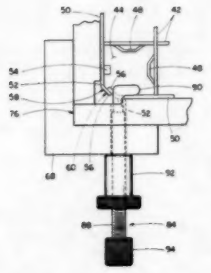
enable said top and bottom seat members to reciprocate with respect to one another with the space between said top and bottom seat members being coupled together by said arms forming an enclosure for said elastomeric inflatable bag, with end portions of said bag when accommodated within said housing being positioned within each central aperture of said annular seat members.

4,709,909

RETENTION STRAP IN A GRID ASSEMBLY FIXTURE

Robert Duncan, Fork Township, Lexington County, and Wade H. Widener, Cayce, both of S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 17, 1985, Ser. No. 809,703
Int. Cl.[4] B25B *1/20*
U.S. Cl. 269—41 7 Claims



1. An improved retention strap for maintaining a fuel assembly grid in an assembled condition during manufacture thereof, said grid including outer grid straps defining the periphery of the grid and having respective opposite end portions which together in pairs at inner and outer terminal edges thereof overlap one another to form a plurality of corners of the grid, said retention strap comprising:

(a) a plurality of members extending along the respective outer grid straps, between respective corners and about the periphery of the grid when the grid is in the assembled condition;

(b) means interconnecting said members so as to form a plurality of substantially squared corners located generally outwardly of and adjacent to the corners of the grid; and

(c) means mounted at said squared corners being operable for engaging selected ones of the end portions of the outer grid straps forming the respective corners of the grid to pull outwardly on the end portions and secure them respectively adjacent said squared corners of said retention strap in order to prevent distortion of the grid corners during welding of the respective outer grid strap end portions to form the grid corners;

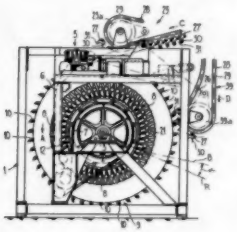
(d) said operable means engaging only said ones of said outer grid strap end portions having said inner ones of said overlapped terminal edges thereon, the location of engagement of said operable means with said outer grid strap end portions being displaced from the location of overlap of said terminal edges with one another such that said engaged outer grid strap end portions can be secured by said operable means in contact adjacent said respective squared corners of said retention strap.

4,709,910

REMOVABLE DIVIDER WALL CELL WHEEL APPARATUS FOR PROCESSING PRINTED PRODUCTS

Werner Honegger, Tann Rüti, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Feb. 9, 1987, Ser. No. 12,808
Claims priority, application Switzerland, Feb. 14, 1986, 602/86
Int. Cl.[4] B65H *5/30*
U.S. Cl. 270—55 7 Claims



1. An apparatus for processing printed products, especially for stuffing inserts into the printed products, comprising:

a cell wheel having a substantially horizontally extending longitudinal axis and a periphery;

means for rotatably driving said cell wheel about said substantially horizontally extending longitudinal axis;

said cell wheel comprising a plurality of compartments each having a lengthwise direction of extent;

each of said plurality of compartments being open at said periphery of said cell wheel for receiving the printed products;

means provided for each compartment for advancing the printed products in the lengthwise direction of extent of each said compartment and serving for forwardly feeding the printed products in each compartment in the direction of said substantially horizontally extending longitudinal axis of said cell wheel;

at least one removable divider wall operatively associated with each compartment;

each said removable divider wall extending into each said associated compartment of said plurality of compartments and dividing each said compartment into two feed channels for the printed products;

said means for advancing the printed products having an operative region in the associated compartment thereof;

said removable divider wall of each said associated compartment being located exterior to said operative region of said means for advancing the printed products in the associated compartment and being detachably connected to said cell wheel; and

said means for advancing the printed products stuffed into said feed channels in each said associated compartment being capable of conjointly advancing the printed products in each said compartment.

4,709,911

AUTOMATIC SHEET FEEDING DEVICE

Eisaku Saiki, Yokohama, and Masataka Kawauchi, Ishioka, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

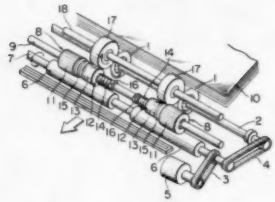
Continuation of Ser. No. 578,110, Feb. 8, 1984, abandoned. This application Mar. 6, 1987, Ser. No. 22,958
Claims priority, application Japan, Feb. 16, 1983, 58-22725
Int. Cl.[4] B65H *3/52*
U.S. Cl. 271—10 6 Claims

1. An automatic sheet feeding device for successively feeding sheets from a stack of sheets by separating the sheets, each sheet having a substrate and a material applied to a surface of the substrate so the material side of the sheet has a higher

coefficient of friction than the substrate side of the sheet, the device comprising:

feeding means for feeding the sheets from said stack of sheets;

separating means cooperating with said feeding means for separating the sheets, such that said material side of the sheet to be fed tends to be separated from the substrate side of an adjacent sheet when a friction force acts on the material side of the sheet to be fed as a result of each sheet being in contact with said separating means during feeding, so as to allow the sheets to be fed one by one by said feeding means, a coefficient of friction of the separating



means with respect to the sheets being lower than the coefficient of friction of the feeding means with respect to the sheets and higher than a coefficient of friction of one sheet with respect to another sheet;

torque regulating means for regulating a torque applied to said separating means;

rotating means for rotating the separating means through said torque regulating means; and

wherein said separating means are maintained in engagement with the rotating means and feeding means in such a manner that the separating means can be rotated freely in a direction in which the sheets are fed and in a direction opposite to the direction in which the sheets are fed.

4,709,912

APPARATUS FOR SEPARATING AND CONVEYING SHEET-LIKE ARTICLES

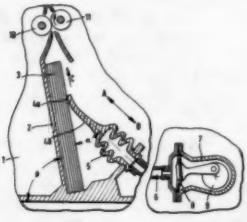
Egon Illig, Stuttgart, and Volkmar Kniep, Esslingen, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.v., Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 839,047

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1985, 3508737

Int. Cl.[4] B65H *3/24*

U.S. Cl. 271—42 **16 Claims**



1. An apparatus for separating and transporting sheet-like articles from a stack of sheet-like articles, comprising:

a stacking table for holding the stack of sheet-like articles and defining a transport direction into which the sheet-like articles are to be transported from the stack;

a pair of conveyor rollers arranged at a predetermined distance from the stack in the transport direction for conveying the sheet-like articles further in the transport direction;

continuously reciprocating drive means for generating a reciprocating movement in a predetermined direction toward and away from the stack, said predetermined direction being inclined with respect to the transport direction by a predetermined angle; and

a friction element attached at one end to the drive means and extending away from the drive means in said predetermined direction, said friction element including at its other end an elastic portion which can be flexed elastically away from said predetermined direction,

said elastic portion being arranged to impinge on the uppermost one of the sheet-like articles at least during a part of that portion of the reciprocating movement directed toward the stack thereby bending said elastic portion and increasing the pressure exerted by said elastic portion on the uppermost one of the sheet-like articles, and to be straightened at least during a part of that portion of the reciprocating movement directed away from the stack thereby decreasing the pressure exerted on the uppermost one of the sheet-like articles.

4,709,913

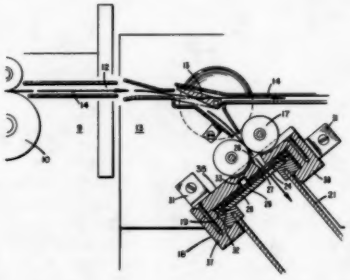
STORAGE CASSETTE FOR FILM PROCESSING SYSTEM

Lee B. Cagey, Fairfax, Va., assignor to LogEtronics, Inc., Springfield, Va.

Filed Nov. 5, 1986, Ser. No. 927,030

Int. Cl.[4] B65H *31/00*

U.S. Cl. 271—207 **4 Claims**



1. In a system for transferring film material sheets to a processing system, and alternatively diverting said sheets to a storage cassette, a removable light-tight cassette for storing said film material sheets comprising:

a mounting bracket for supporting a rectangular enclosure in a position for receiving said sheets, said bracket including a rectangular channel having a base with a first longitudinal extending slot for passing said material sheets, and first and second lateral camming slots, the first of said camming slots beginning on one side of said longitudinal slot, extending parallel to said longitudinal slot and thence at an angle away from said longitudinal slot, said second camming slot beginning at an opposite side of said longitudinal slot extending parallel to said longitudinal slot and thence at an angle thereto, ending at a point between said longitudinal slot and said first camming slot; and,

a cassette for storing said film material sheets comprising a rectangular flange having a width and thickness for being received in said rectangular channel, said flange having a slot which aligns with said material passing slot;

a spring biased door supported for movement in the plane of said flange to cover said slot, said door being movable between a covering position and an uncovering position, said door including on opposite ends two upstanding camming tabs, each located on an opposite side of said material passing slot and positioned to be received in one of said camming slots; and

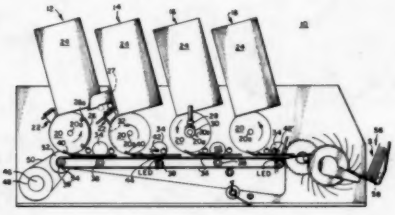
an enclosure connected to said flange for receiving and storing said material sheets.

4,709,914

ELECTRONIC CONTROLLER FOR DISPENSERS AND THE LIKE

Lawrence D. Taylor, Lansdale, Pa., assignor to Brandt, Inc., Bensalem, Pa.

Filed Feb. 7, 1985, Ser. No. 699,055
Int. Cl.[4] B65H *7/12*
U.S. Cl. 271—263 **14 Claims**



1. An adaptive density measurement technique for use on sheets normally moving one-at-a-time between a light source and a sensor which generates an output whose value D represents sheet density;

comprising the steps of:

sampling the sensor output at N intervals as the sheet is passing the sensor where N>1;

summing the value D which for the first sheet is represented by the sum

$$S_{01} = \Sigma D_n \Big|_{n=1}^{n=N};$$

forming N additional sums S_1 through S_m of the values D such that each sum

$$S_m = \Sigma D_n \Big|_{n=1}^{n=N-m}$$

where m=1, 2, . . . N-1;

sampling the next sheet N times to obtain density samples;

summing the samples D_{n2} *for the next sheet to form a sum* S_{02} such that

$$S_{02} = \Sigma D_{n2} \Big|_{n=1}^{n=N};$$

comparing S_{02} with S_0;

halting sheet movement if $/S_{02}-S_{01}/>V$ where V is a first predetermined value.

4,709,915

SORTING APPARATUS

Tadashi Ishikawa, Urawa; Kazuhiro Matsuo, Tokyo, and Akimitsu Hoshi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 663,678, Oct. 18, 1984, abandoned.
This application Feb. 18, 1987, Ser. No. 17,032
Claims priority, application Japan, Oct. 22, 1983, 58-197869
Int. Cl.[4] B65H *39/11*
U.S. Cl. 271—288 **8 Claims**

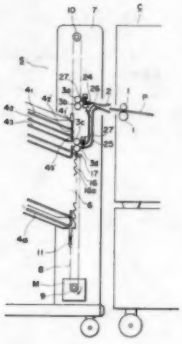
1. A sorting apparatus, comprising:

a plurality of trays arranged in substantially a vertical direction and movable in said direction;

a first sheet inlet for receiving a sheet material and directing it to one of said trays;

a second sheet inlet, disposed at a level lower than said first sheet inlet, for receiving the sheet material and directing it to said trays;

guiding means for guiding the sheet materials only to said first sheet inlet in a non-sorting mode operation, and for guiding the sheet material only to said second inlet in a sorting mode operation; and



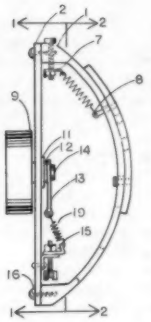
driving means for holding said one of said trays at a position for receiving the material from said first sheet inlet in the non-sorting mode operation and for setting, in the sorting mode operation, a topmost one of said trays for sorting, substantial alignment with said second sheet inlet and then driving said trays upward to sequentially dispose said plural trays a substantial alignment with said second sheet inlet.

4,709,916

BOWLERS GRIP EXERCISER

Dean Clark, Box 1821, Riverton, Wyo. 82501

Filed Mar. 10, 1986, Ser. No. 837,901
Int. Cl.[4] A63B *5/00, 21/02;* **A61H** *1/02*
U.S. Cl. 272—67 **2 Claims**



1. In a device for exercising a bowler's fingers, hand and wrist wherein the improvement comprises:

a. an arcuate chord shaped casing having the same radius as a bowling ball;

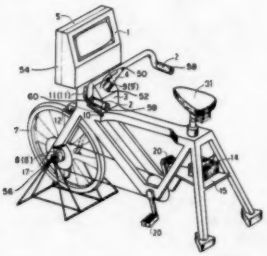
b. two slidable arcuate members with finger grips spring tensioned in the finger extended position;

c. longitudinal slots in the arcuate casing for guiding the movement of the finger grips;

d. a thumb grip on the arcuate casing;

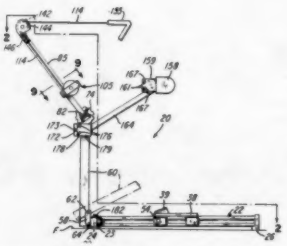
e. the position of the finger and thumb grips simulating the arrangement of the finger holes on a bowling ball;
f. means for tensioning the movement of the finger grip members towards the thumb grip;
g. a rotatable hand grip knob on the bottom of the exerciser; and,
h. said rotatable hand grip knob spring tensioned in torsion with respect to the casing.

4,709,917
MOCK BICYCLE FOR EXERCISE AND TRAINING EFFECTS
Tai-her Yang, 5-1, Tai-Pin Street, Kuang-Hwa Li, Si-Hu Jenn, Chang-Hwa Hsien, Taiwan
Continuation of Ser. No. 414,876, Sep. 3, 1982, abandoned. This application Apr. 29, 1985, Ser. No. 726,961
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—73 **2 Claims**



1. An exercise apparatus comprising:
a frame for supporting a user;
first mechanical means, rotatably journaled to said frame, for being rotated by the feet of a user;
velocity sensing means, coupled to said first mechanical means, for producing a first signal proportional to the angular velocity of the rotation of said first mechanical means;
second mechanical means, rotatably journaled to said frame, for being manipulated between a first and a second position by the hands of the user;
position sensing means, coupled to said second mechanical means, for producing a second signal indicative of the position of said second mechanical means;
electronic simulation means, mounted to said frame and responsive to said first and second signals, for providing a changing visual scene simulating road conditions, said scene simulating inclines and declines in said simulated road conditions, the rate of change of said scene responsive to said first signal, the position of said scene with respect to said user responsive to said second signal;
resistance control means, responsive to said simulated inclines and declines, for automatically applying a variable braking torque to said first mechanical means, wherein said resistance control means includes multi-pole A.C. synchronous induction motor means, mechanically coupled to said first mechanical means, for converting the rotational energy of said first mechanical means to electrical energy, said electrical energy being fed back to said motor means when said first mechanical means is rotated at an angular velocity exceeding the synchronous speed of said motor means, said motor means converting said fed back electrical energy to braking torque for braking said first mechanical means; and
one-way transmission means for coupling braking torque produced by said motor means to said first mechanical means whenever said first mechanical means is rotated at an angular velocity exceeding the synchronous speed of said motor means, and for permitting said first mechanical means to freely rotate at a velocity less than the synchronous speed of said motor means.

4,709,918
UNIVERSAL EXERCISING APPARATUS
Arkady Grinblat, 52 Fairfax St., Somerville, Mass. 02144
Filed Dec. 29, 1986, Ser. No. 946,910
Int. Cl.[4] A63B *69/18, 21/04*
U.S. Cl. 272—97 **20 Claims**

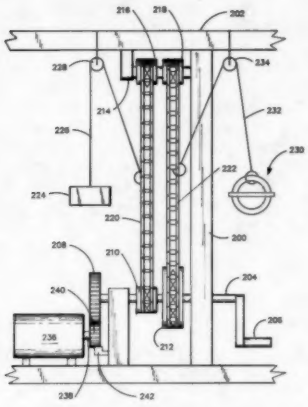


1. Apparatus for performing a variety of body exercises, comprising an elongated generally horizontal base frame having first and second end portions, a pair of foot support members, means mounted on said base frame and supporting said foot members for corresponding longitudinal movement along generally parallel spaced paths, a generally vertical column having a lower end portion and an upper end portion, means for securing said lower end portion of said column to said first end portion of said base frame, a pair of arms each having inner and outer end portions, means connecting said inner end portions of said arms to said upper end portion of said column and providing for substantial rotation of said arms about a generally horizontal axis and for substantial pivotal movement of each said arm about an axis transverse to said horizontal axis, means for locking said arms at different rotary and pivoted positions, a spring retractable reel operatively connected to each said arm and having a flexible cable with a free end portion, means for directing each said cable from said outer end portion of the corresponding said arm generally horizontally regardless of the position of said arm, a handle grip member connected to said free end portion of each said cable, and a one-way clutch and adjustable brake mechanism associated with each said reel to provide for selecting the force required to extend each said cable according to the selected exercise being conducted on said apparatus.

4,709,919
EXERCISE MACHINE
Richard A. Cano, 1118 Cypress, Pueblo, Colo. 81004
Continuation-in-part of Ser. No. 93,046, Nov. 13, 1979, abandoned. This application Apr. 19, 1982, Ser. No. 369,820
Int. Cl.[4] A63B *21/06*
U.S. Cl. 272—117 **9 Claims**

1. A machine for use in exercising a human body comprising:
a frame;
a first sprocket mounted on and rotatable relative to said frame;
a second sprocket mounted on and rotatable relative to said frame;
an axle mounted on and rotatable relative to said frame;
a third sprocket fixedly mounted on said axle;
a fourth sprocket fixedly mounted on said axle;
a first endless chain intermeshing with said first sprocket and said third sprocket and a second endless chain intermeshing with said second sprocket and said fourth sprocket whereby said first, second, third and fourth sprockets rotate concurrently;
a weight connected to and suspended by said first endless

chain, whereby concurrent rotation of said first, second, third and fourth sprockets causes a concomitant vertical displacement of said weight; and



means for causing concurrent rotation of said first, second, third and fourth sprockets, said rotation causing means connected to said second endless chain and said rotation causing means adapted for forceful contact with a limb of the user's body.

4,709,920

EXERCISING APPARATUS

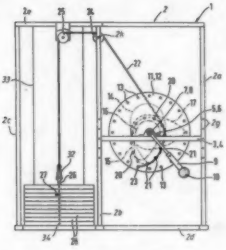
Josef Schnell, Sportweg 9, Ortsteil Peutenhausen, 8899 Gachenbach, Fed. Rep. of Germany

Filed May 22, 1986, Ser. No. 866,217

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1985, 3539796

Int. Cl.[4] A63B *21/06*

U.S. Cl. 272—117 **17 Claims**



1. Exercising apparatus, comprising:

a frame;

a user-actuated member connected to said frame;

weight means for providing resistance during an exercise;

force transfer means operatively connected to said weight means and to said user-actuated member; and

adjusting means for providing varying moment arms to allow a modification of the resistance as provided by said weight means without changing the initial position of said user-actuated member, said adjusting means being interposed between said force transfer means and said user-actuated member and selectively defining a plurality of paths for guiding said force transfer means to allow each muscle of a human body to be exercised according to its capability in each phase of motion.

4,709,921

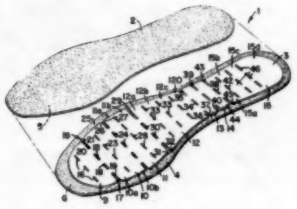
WEIGHTED INSOLE

Antonette G. Valuikas, and Ralph Valuikas, both of 2098 Highwood Ave., St. Paul, Minn. 55119

Filed Mar. 5, 1986, Ser. No. 836,439

Int. Cl.[4] A63B *23/04*; A64B *21/18*

U.S. Cl. 272—119 **5 Claims**



1. A weighted insole adapted to be placed inside of a shoe comprising:

(a) a first sheet of a flexible material having the planform of a shoe sole;

(b) a relatively dense base member, the base member having a planform substantially identical in shape, but somewhat smaller in dimension, than the first sheet of flexible material, the base member possessing a series of lateral perforations, the perforations defining joints within the base member such that the base member has sufficient flexibility to conform to foot movement;

(c) a second sheet of a flexible material having a planform substantially identical to the planform of the first sheet; and

(d) an adhesive for securing the first sheet, the base member and the second sheet in a layered relationship such that the base member is permanently constrained between the first and second sheet, the adhesive being applied to the first sheet and the second sheet such that the first and second sheet are secured together and the base member is constrained between the first and second sheet.

4,709,922

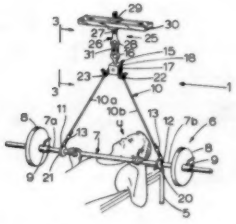
BARBELL SUPPORT APPARATUS FOR WEIGHT LIFTING EXERCISING

James R. Slade, Jr., 45 Cedar Hill Rd., Randallstown, Md. 21133, and Richard F. Sterba, 9536 Bauer Ave., Baltimore, Md. 21236

Filed Jan. 21, 1986, Ser. No. 821,162

Int. Cl.[4] A63B *13/00*

U.S. Cl. 272—123 **4 Claims**



1. In a barbell support means for adjustably supporting a barbell from a fixed support above a user in position for the barbell's being raised from a starting position and lowered to a rest position by said user in exercising, the barbell support means including a fixed support and an elongate member having means for attachment to a first end of the barbell, said

elongate member extending over a portion of said fixed support and having means for attachment to a second end of the barbell, the improvement comprising in combination: means for protecting a user from injury consequent to the user's raising the barbell from a starting position at a selected angle and lowering it to a rest position at an angle different from that of the starting position, consisting of: first and second stops mounted on the elongate member on opposite sides of the fixed support, said portion of the fixed support being anti-friction means for permitting the elongate member to pass freely back and forth over the fixed support anywhere between the first stop and the second stop when supporting the barbell, for return of the barbell to said starting position.

4,709,923

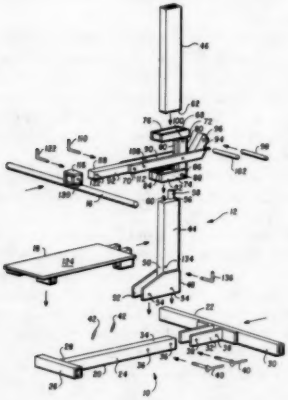
PORTABLE EXERCISE MACHINE

Christopher S. Gibson, 403 St. Ronan St., New Haven, Conn. 06511

Continuation-in-part of Ser. No. 669,680, Nov. 9, 1984, Pat. No. 4,618,144. This application Oct. 20, 1986, Ser. No. 922,077

Int. Cl.[4] A63B *21/00*

U.S. Cl. 272—134 **15 Claims**



1. A portable self-contained exercise machine kit in a compact, hand-transportable, generally rectangular configuration readily assemblable for performing upper and lower body exercises comprising

a first base member having a longitudinal extending section and a transverse section,

a second base member having an elongated section and being configured for detachable connection to said first base member to form a stable ground-engaging base for an exercise machine, said first and second base members having cooperating means for readily detachable interconnection such that said elongated section is disposed generally parallel to said transverse section of said first base member,

first and second stanchion members having cooperating means for readily detachable interconnection to form an elongated support stanchion, said first stanchion member having means for detachable connection to said base so that said support stanchion extends vertically upward from said ground engaging base,

an exercise arm assembly for performing upper and lower body exercises having a pivotal exercise arm detachably mountable to said support stanchion so as to extend over said base and means for detachably mounting said exercise arm to said support stanchion at a plurality of selected vertical positions,

an elongated handle member having means for detachable connection to said exercise arm,

a bench member for mounting on said base for sitting and lying position exercises,

said first and second base members, said first and second stanchion members, and said handle member being substantially no longer than said bench member and being nested with said exercise arm assembly against said bench member to form a substantially rectangular compact configuration for transport and storage, and

means for maintaining said first and second base members, said first and second stanchion members, said exercise arm assembly, said handle member, and said bench member in said compact configuration.

4,709,924

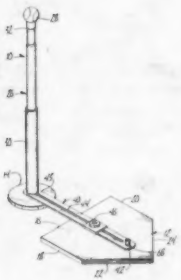
ADJUSTABLE BATTING TEE

Richard A. Wilson, and Joseph C. Barbaglia, both of Centerville, Iowa, assignors to Robert L. Wright, Des Moines, Iowa

Continuation-in-part of Ser. No. 626,886, Jul. 2, 1984, abandoned. This application Oct. 3, 1985, Ser. No. 783,852

Int. Cl.[4] A63B *69/40*

U.S. Cl. 273—26 R **8 Claims**



1. An adjustable batting tee for use on ground and floor support surfaces, comprising:

a first plate member positioned on said support surface;

a second plate member positioned on said support surface and spaced apart from said first plate member, said second plate member having substantial area for contact with said support surface but being smaller in area than said first plate member;

an upright ball support means attached to said second plate member for supporting a ball to be hit; and

an elongated flexible armature having a first end connected to said first plate member by a first fastener means and a second end connected to said second plate by a second fastener means, at least one of said first and second fastener means beng adjustable such that the relative position of said second plate member with respect to said first plate member is selectively adjustable;

said second plate member being adapted to tip on said support surface in response to a bat impacting said ball or said ball support means such that said armature flexes upwardly between the ends thereof to absorb the forces of impact and thereby minimizes transmission of forces from said ball support means to said first fastener means and whereby movement of said first plate member with respect to said support surface is substantially eliminated.

4,709,925
TACTILE TRAINING DEVICE FOR A TENNIS RACKET HANDLE

C. Elmon Gatlin, 620 E. Twiggs, Tampa, Fla. 33602

Continuation of Ser. No. 682,803, Dec. 17, 1984, abandoned, which is a continuation of Ser. No. 431,797, Sep. 30, 1982, abandoned. This application Jan. 27, 1986, Ser. No. 823,128
Int. Cl.[4] A63B *69/38*
U.S. Cl. 273—29 A 9 Claims

1. A training device for tactually indicating to a player whether the player's hand has properly gripped the handle of a racket for forehanded play and for backhanded play, with the proper forehanded play position being defined as gripping the handle such that the racket face is substantially parallel to the heel of the player's hand and with the proper backhanded play being defined as gripping the handle ninety degrees from the proper forehanded play position, comprising in combination:

an elongated member;

means for connecting said elongated member relative to the butt of the racket in a non-rotatable position substantially parallel to the face of the racket such that said elongated member bears evenly against the heel of the player's had when the player has properly gripped the racket in the forehanded position, thereby tactually indicating to the player whether the racket is properly oriented for forehanded play; and

said elongated member including a contoured recess configured to comfortably receive the outer edge of the player's hand when the player's hand has been rotated substantially ninety degrees from the forehanded play position to the backhanded play position with the elongated member unchanged in its location relative to the handle thereby tactually indicating to the player whether the racket is properly oriented for backhanded play.

4,709,926
ELECTORAL COLLEGE GAME

Leo C. DiEgidio, 10512 Northfield Rd., Northfield, Ohio 44067

Continuation of Ser. No. 544,097, Oct. 21, 1983, abandoned. This application May 15, 1986, Ser. No. 867,418
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—257 8 Claims

1. A political campaign game for simulating the electoral college of the United States, comprising:

a game board having a playing surface defining a plurality of playing zones which establish a continuous path, one of said playing zones providing a starting position from which play is commenced, said playing zones including:

a first group of popular vote-obtaining zones each of which contains the names of a predetermined number of voting areas selected from fifty states and the District of Columbia, at least two of the zones of said first group containing the name of the same voting area; and

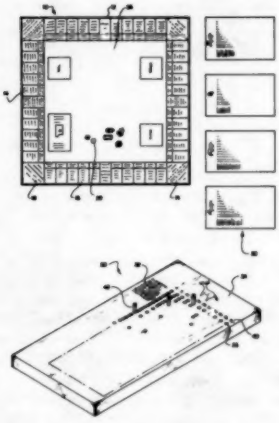
a second group of political occurrence zones containing instructions for the drawing and using of cards;

a player scoring means for each player, each scoring means having a scoring surface with indicia indicating a candidate from a political party, a list of voting areas, and a score registering means for indicating the percentage of popular votes received in each voting area;

a plurality of distinct play pieces representing candidates from different political parties, each piece being selected and used by a player and moved along the continuous path;

a chance means for randomly determining the number of playing zones a play piece may be moved during a given player's turn;

a plurality of state cards, each of said cards having indicia setting forth the number of electoral votes available in that voting area, each of said state cards being presented to a player upon that player attaining 50 percent of the popular vote in that state; and



a plurality of political occurrence cards containing instructions for controlling the actuation of said score registering means by a player, said political occurrence cards including:

cards which set forth a speech made by the player who draws that card and which causes popular votes to be gained or lost in predetermined voting areas;

cards setting forth events likely to occur during the course of a campaign, which cards instruct the player drawing a given card to gain or lose popular votes in predetermined voting areas; and

cards which permit the player drawing a given one of the cards to enter into agreements with the other players regarding the gain or loss of votes in predetermined voting areas or the gain or loss of state cards.

4,709,927
GAME BOARD CONSTRUCTION

Thomas L. Cline, Hanover, Pa., assignor to Corra-Board Products Co., Inc., Hanover, Pa.

Filed Sep. 15, 1986, Ser. No. 907,416
The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.
Int. Cl.[4] A63F *3/00;* B32B *3/28, 7/02*
U.S. Cl. 273—286 1 Claim

1. A game board structure (10) having a solid left panel (20), a solid right panel (21) and a foldable middle section (25),

said panels (50) having an overlayer (51) comprised of chipboard material having relatively shorter fiber lengths (60) contained therein, said chipboard material being solid and devoid of perforations or apertures,

said panels having an underlayer (52) comprised of chipboard material having relatively shorter fiber lengths (60)

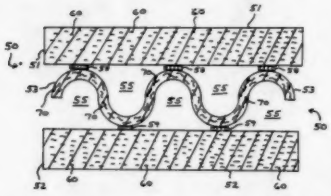
contained therein, said chipboard material being solid and devoid of perforations or apertures,

said panels further having an undulating midstratum layer (53) between said overlayer (51) and underlayer (52),

wherein the upper undulation portions of said midstratum layer (53) are secured directly to said overlayer (51) by adhesive means (58),

and wherein the lower undulation portions of said midstratum layer (53) are secured directly to said underlayer (52) by adhesive means (59),

said panels providing means wherein air cells (55) are formed internally thereof such that a given game board caliper or thickness may be maintained while reducing the number of chipboard layers required for construction,



wherein said undulating midstratum layer (53) has relatively longer fiber lengths (70) contained therein as compared to the relatively shorter fiber lengths (60) contained in said overlayer (51) and said underlayer (52),

wherein the average fiber length (60) of said overlayer (51) and said underlayer (52) is two millimeters or less,

wherein the average fiber length (70) of said undulating midstratum layer (53) is five millimeters or more,

wherein said air cells (55) are formed between said overlayer (51) and said underlayer (52) by way of said undulating midstratum layer (53) such that the overall weight of a panel (50) is reduced while improving panel strength via the spring-like effect of said midstratum layer and by the relatively longer fiber lengths (70) contained in said midstratum layer.

4,709,928

CIRCULAR GAME BOARD FOLDABLE INTO SMALL VOLUME

W. Preston Willingham, 1399 ½ Miller Ave., Winter Park, Fla. 32789

Filed Jun. 19, 1986, Ser. No. 876,119

Int. Cl.[4] A63F *9/00*

U.S. Cl. 273—309 **18 Claims**

1. A circular game board foldable into thirds for storage, comprising a circular playing surface bounded by a generally tubular member affixed around the periphery of said playing surface, a spring-like member disposed in said tubular member, which spring-like member normally serves to keep said playing surface in a taut condition, means for securing the ends of said spring-like member together so as to create an endless ring, said game board being readily foldable into a smaller configuration for storage, said spring-like member being in the form of a length of thin metal, whose ends have been joined together

after insertion into said tubular member to form the endless ring serving to keep said playing surface taut.

4,709,929

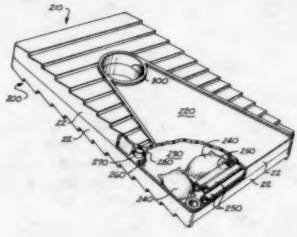
GAME BOARD

Russell C. Mills, 113 Oak, Elmhurst, Ill. 60126, and Stewart C. Jager, 266 W. Norman, Wheeling, Ill. 60090

Filed Mar. 23, 1987, Ser. No. 28,965

Int. Cl.[4] A63B *67/00*

U.S. Cl. 273—402 **20 Claims**



18. A game apparatus having a pair of separable target members adapted to receive similar but distinguishable playing pieces tossed thereat, said apparatus comprising:

a pair of generally planar target members separably engageable in back-to-back relationship for portability and storage thereof, and adapted to be placed in play positions when separated, wherein each of said target members have target surfaces which generally include a relatively centralized scoring opening, a structurally-designated scoring area, and a plurality of baffle-configured projections disposed on said target surface in complement to said scoring opening and scoring areas.

4,709,930

SHAFT AND SEALING RING

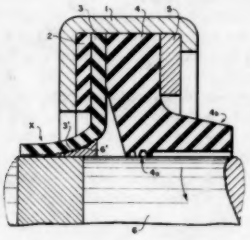
Hans Forch, Birkenau, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim/Bergstr., Fed. Rep. of Germany

Filed Mar. 6, 1985, Ser. No. 708,704

Claims priority, application Fed. Rep. of Germany, May 19, 1984, 3418738

Int. Cl.[4] F16J *15/32, 15/54*

U.S. Cl. 277—68 6 Claims



1. In a seal combination of a shaft with a polymeric sealing ring thereabout, the ring having an inner, sealing surface which flares against a counter surface on the shaft to form a dynamic fluid-sealing zone therebetween upon relative rotation of the shaft and ring, the improvement comprising:

first hydrodynamically-acting feed-back means having a first spiral groove on the sealing surface of the ring for pumping fluid which seeps into the dynamic sealing zone upon the relative rotation; and

second hydrodynamically-acting feed-back means having a second spiral groove on the counter surface of the shaft for pumping fluid which seeps into the dynamic sealing zone upon the relative rotation,

said first spiral groove having at least one dimension of its pitch and depth dimensions, respectively, which is different from that of said second spiral groove;

wherein said first and second feed-back means have different pumping actions with a net axial component of said pumping actions in an axial direction along the shaft.

4,709,931

SEAL FOR DAMPERS ON MOTOR VEHICLES

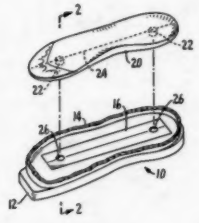
Keiichi Shimizu; Sanae Kikuchi, and Hitoshi Nakano, all of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 872,161

Claims priority, application Japan, Jun. 13, 1985, 60-128645

Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—153 9 Claims



1. A seal for use in a damper having a fluid cylinder, a piston axially slidable in the cylinder, and a piston rod secured to the piston, said seal comprising an annular contacting portion adapted to be held in contact with the outer peripheral surface of said piston rod and a resilient connecting portion having one end joined to said contacting portion and the other end adapted to be secured to the inner peripheral surface of said cylinder, said contacting portion being movable with said piston rod when the piston rod is moved with respect to said cylinder in a higher-frequency, smaller-amplitude range.

4,709,932

DOUBLE WIPER SEAL ARRANGEMENT

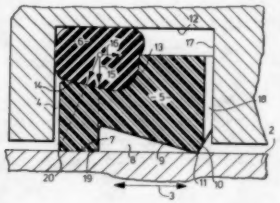
Roy Edlund, Stuttgart, Fed. Rep. of Germany, and Jorgen Hom, Holte, Denmark, assignors to Busak & Luyken GmbH and Co., Stuggart, Fed. Rep. of Germany

Filed Jan. 30, 1987, Ser. No. 9,298

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603669

Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—165 5 Claims



1. Double wiper arrangement comprising a wiper ring made from a tough elastic material and fitted in the groove of one of two machine parts which are movable in a direction perpendicular to the said groove, and a stressing ring made from a rubber-elastic material, arranged between the wiper ring and the base of the groove and loading the wiper ring in the radial direction, the wiper ring being provided on its one end with a surface portion which rests flat against the other machine part, with an edge near its other end which rests against the other machine part and which is formed by the line of intersection of two conical surfaces rising outwardly and towards the flat surface portion, respectively, and with a recess arranged on its side facing the base of the groove, opposite the flat surface portion, for receiving the stressing ring, characterized by the combination of the following features:

(1) the said groove is only little larger than the width of the said wiper ring, and the depth and width of the said recess as well as the dimensions of the said stressing ring are adapted to each other in such a manner that

(a) the said wiper ring is retained in the groove in contact with the flank of the groove which is opposite to the said stressing ring, at least under normal operating conditions, and

(b) the maximum of pressure exerted by the said stressing ring is situated above the inner edge of the said flat surface portion,

(2) the recess extending concentrically to the base of the said groove rises towards the end of the said wiper ring so that the space accommodating the said stressing ring gets narrower towards the end of the said wiper ring and the force exerted by the said stressing ring produces a contact pressure which declines at least nearly linearly along the said flat surface portion, starting from its inner end, but is still defined at the outer end thereof, and

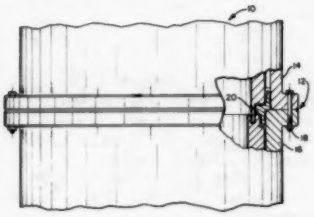
(3) the end face adjacent the outer conical surface is provided with radial relief grooves.

4,709,933

TEMPERATURE TRANSIENT RESISTANT SEAL

Frank C. Adamek, Pasadena, and Charles D. Bridges, Houston, both of Tex., assignors to Vetco Gray Inc., Houston, Tex.

Filed Apr. 16, 1987, Ser. No. 39,060
Int. Cl.[4] F16J 15/06
U.S. Cl. 277—167.5 5 Claims



1. A temperature transient resistant seal apparatus for sealing a circumferential joint in a cylindrical pressure vessel comprising:

said pressure vessel including an upper cylinder, a lower cylinder, means for securing said upper and lower cylinders against relative axial movement, an inwardly facing upper seal surface on said upper cylinder, and an inwardly facing lower seal surface on said lower cylinder;

a substantially cylindrical seal ring including an inwardly extending rib having exposed upper and lower surfaces;

an upwardly extending first cantilever arm of substantially cylindrical form, integral with an outboard portion of said rib;

a first outwardly facing seal surface located on an upper portion of said first cantilever arm;

a downwardly extending second cantilever arm of substantially cylindrical form, integral with an outboard portion of said rib;

a second outwardly facing seal surface located on a lower portion of said second cantilever arm;

said cantilever arms each joining said rib with a smooth radius, whereby stress concentrations are avoided and conduction of heat from said rib to said cantilever arms is facilitated;

said first seal surface engaging said inwardly facing surface on said upper cylinder;

said second seal surface engaging said inwardly facing surface on said lower cylinder;

the length of each cantilever arm from rib to said outwardly facing seal surface being greater than the minimum thickness of the respective cantilever arm.

4,709,934

VEHICLE LEVELING SYSTEM

Hideo Suzuki; Kunihide Okamoto; Yasuyuki Hayashi, and Mitsuru Aiba, all of Shizuoka, Japan, assignors to Kabushiki Kaisha Showa Seisakusho, Tokyo, Japan

Filed Dec. 18, 1985, Ser. No. 811,943
Int. Cl.[4] B60G 17/00
U.S. Cl. 280—6 R 10 Claims

1. A vehicle leveling system comprising:

a pneumatic leveling unit for adjusting the height of a vehicle body in response to supply and discharge of a gas pressure to and from the pneumatic leveling unit;

gas pressure generator means for generating the gas pressure to be supplied to said pneumatic leveling unit;

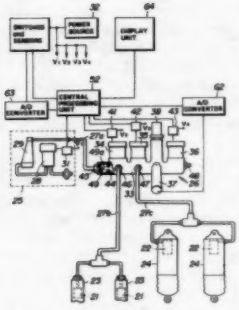
valve means pneumatically connected to said leveling unit and said gas pressure generator means and including a passage for supplying the gas pressure from said gas pressure generator means thereinto, a control valve for bringing said passage into and out of communication with said pneumatic leveling unit, and a release valve for bringing said passage into and out of communication with the atmosphere;

control means for controlling said gas pressure generator means and said valve means to supply the gas pressure to and discharge it from said pneumatic leveling unit;

said control means including switch means and a pressure sensor detecting gas pressure in said passage and generating a pressure output signal representing the detected gas pressure, gas pressure in said pneumatic leveling unit being detectable by said pressure sensor when said passage communicates with said pneumatic leveling unit;

said control means being operable in respnse to commands applied by said switch means and the output signal from said pressure sensor; and

said control means including means operable after the height of the vehicle body has been adjusted for effecting a pressure checking process by closing said control valve, then opening said release valve to vent said passage to the atmosphere, then closing said release valve, and then measuring the gas pressure in said passage with said pressure sensor and determining whether the measured pressure in said passage is substantially equal to the atmospheric pressure.



5. A vehicle leveling system comprising:

a pneumatic leveling unit for adjusting the height of a vehicle body in response to supply and discharge of a gas pressure to and from the pneumatic leveling unit;

gas pressure generator means for generating the gas pressure to be supplied to said pneumatic leveling unit;

valve means pneumatically connected to said leveling unit and said gas pressure generator means;

control means for controlling said gas pressure generator means and said valve means to supply the gas pressure to and discharge it from said pneumatic leveling unit, said control means being arranged such that when the gas is to be discharged from said pneumatic leveling unit for reducing the height of the vehicle body, the control means controls said release valve to intermittently open and close the same according to the output signal of said pressure sensor for thereby reducing the pressure of the gas in said pneumatic leveling unit at a substantially constant speed.

4,709,935

REAR WHEEL STEERING SYSTEM

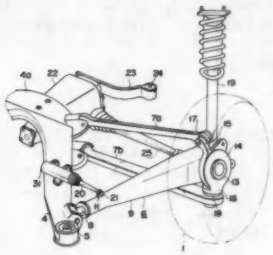
Shozo Takizawa, Okazaki; Kazuyoshi Kobayashi, Oobu; Kazuo Fukuyama, Okazaki; Masanori Tani, Okazaki; Shoji Yamamoto, Okazaki; Hiroo Yuasa, Nagoya; Masayoshi Nishimori, Okazaki; Hiroaki Yoshida, Okazaki; Shinichi Eto, Okazaki; Eiji Hirao, Okazaki, and Masaki Goto, Nagoya, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1986, Ser. No. 883,097

Claims priority, application Japan, Jul. 15, 1985, 60-155522; Nov. 8, 1985, 60-250495; Nov. 8, 1985, 60-172085[U]; May 30, 1986, 61-125276

Int. Cl.[4] B62D *5/06;* **B60G** *7/04*

U.S. Cl. 280—91 **6 Claims**



1. A rear wheel steering system comprising:

a trailing arm having a rear portion connected to the rear wheel for rotatably supporting the rear wheel, said trailing arm having a front end pivotally coupled to a vehicle body, and extending substantially longitudinally of the vehicle body;

upper and lower lateral arms having lateral outward ends pivotally coupled to the rear portion of the trailing arm by means of a ball joint, and lateral inward ends pivotally coupled to the vehicle body; and

steering means having one end pivotally coupled to the trailing arm, for displacing the trailing arm,

said trailing arm including a first arm having front and rear ends, said front end pivotally coupled to the vehicle body, and a second arm having front and rear ends, said rear end coupled to the wheel,

said rear end of the first arm and said front end of the second arm being pivotally coupled to each other and forming an angle therebetween and said rear end of the second arm being pivotally coupled to each of the lateral outward ends of said lateral arms,

said steering means being capable of moving said trailing arm in a plane of the vehicle body to thereby control the angle formed between said first arm and said second arm.

4,709,936

STEERING ASSEMBLY FOR MOTOR VEHICLE

Yutaka Tashiro, and Shoichi Sano, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 9, 1986, Ser. No. 905,755

Claims priority, application Japan, Sep. 11, 1985, 60-201430; Sep. 11, 1985, 60-201431

Int. Cl.[4] B62D *5/06, 3/02*

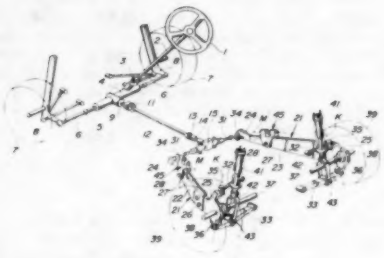
U.S. Cl. 280—91 **14 Claims**

1. A steering assembly in a motor vehicle, comprising:

a trailing arm pivotally supported on a pivot shaft extending substantially transversely of the motor vehicle and rotatably supporting a wheel at a rear end thereof;

a first link having one end pivotally coupled to said trailing arm and extending substantially transversely of the motor vehicle to a second end opposite the one end that is operatively coupled to said steering gear box;

a second link having one end pivotally coupled to an upper potion of sail trailing arm at a rear end thereof by a link in the vicinity of a steering center about which said wheel is steerable and having a second end opposite the one end pivotally supported on a vehicle frame of the motor vehicle;



a third link having one end pivotally coupled to a lower portion of said trailing arm at the rear end thereof by a link in the vicinity of a steering center about which said wheel is steerable with a straight line serving as a kingpin axis for steering said wheel passing through the joints connecting the second and third links to the trailing arm, the third link further having a second end opposite the one end pivotally supported in a vehicle frame of the motor vehicle; and

a steering gear box for steering the wheel.

4,709,937

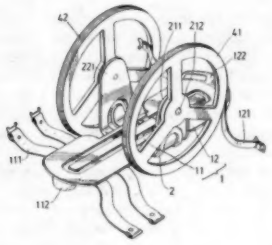
TWO-WHEELED COMBINATION ROLLER SKATE-SKI

Jerry Lin; Brian Lin, and Tiung-Jen Lin, all of No. 215, Sec. 2, Chang Chiang Rd., Panchiao City, Taiwan

Filed Aug. 20, 1986, Ser. No. 898,333

Int. Cl.[4] A63C *17/04*

U.S. Cl. 280—11.2 **5 Claims**



1. A roller skate comprising:

a telescopic flat base member including a front base plate and a rear base plate which overlap and are slideable relative to one another, each base plate having two parallel longitudinal guide grooves extending therein and two longitudinally elongated positioning apertures spaced apart from one another and extending in each of said grooves, said positioning apertures of said front base plate being in register respectively with said positioning apertures of said rear base plate;

screw means to penetrate through said positioning apertures and to adjustably clamp said front and rear base plates against one another;

two wheels to be mounted on said base member;

safety foot straps attached to said base member for retaining a player's foot on said base member,

a telescopic transverse frame for mounting said wheels which includes a left frame and a right frame each of which has a horizontal plate portion underlying and clamped against said base member, and an upstanding portion extending upward from said horizontal plate portion past one of the sides of said base member, said horizontal plate portions of said left and right frames being slideable relative to one another, overlapping one another, and having four transversely elongated openings to register with said positioning apertures to receive said clamping screw means, and two wheel mounting shafts projecting horizontally outwardly from said upstanding portions of said left and right frames at a height which permits said wheels to be rotatably mounted with the centers thereof substantially higher than said telescopic frame; and

a brake member removably attached to the underside of said front base plate.

4,709,938

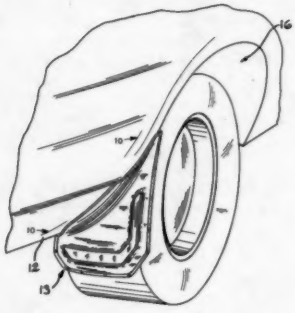
SPLASH GUARD

Douglas K. Ward, and Jerry N. Moscovitch, both of Toronto, Canada, assignors to Powerflow, Inc., Buffalo, N.Y.

Filed Nov. 18, 1985, Ser. No. 799,332

Int. Cl.[4] B62B 9/14

U.S. Cl. 280—154.5 R **18 Claims**



1. A splash guard for use on auto vehicle having a body panel including a flange defining a wheel well opening curved in a plane of cross section longitudinal of the vehicle and a body surface curved in a plane of cross section transverse to the vehicle, the splash guard being formed of a material which is sufficiently elastic to permit deformation during installation but sufficiently inelastic to substantially retain its shape once installed on a vehicle, the splash guard comprising:

(a) a body portion having, in an upright plane of cross section when the splash guard is in use, a curved contour;

(b) the body portion including an upper section having an outer surface and an opposed curved surface adjacent a mounting part of the body portion, the mounting part having a wheel well flange engagement surface adapted to engage and cover a section of such wheel well flange when in use;

(c) the mounting part having a curvature in an upright plane of cross section substantially equal to or greater than the curvature of a wheel well flange of substantially any vehicle of intended use whereby when in use such mounting part either remains undistorted or is distorted into a condition of lesser curvature;

(d) the body portion also including a lower splash deflecting section of a transverse dimension greater than the remainder of the body portion and greater than the transverse dimension of any original equipment tire on any such vehicle of intended use;

(e) the splash deflecting section being dished to provide enhanced vehicle splash protection when in use;

(f) the splash guard also including a flange portion projecting from the body portion in a direction that is rearwardly when in use, the flange portion being curved transversely of the body portion in a contour substantially complemental to the adjacent opposed surface such that the flange portion and the opposed surface define spaced extremities of the wheel well flange engagement surface;

(g) the flange portion including a body panel engagement surface at an acute angle with the flange engagement surface in a plane of cross section longitudinal of the vehicle when the splash guard is in use;

(h) the flange portion also having an outer surface contoured to a configuration which disguises any deformation of the flange portion which may occur when the splash guard is in use and the panel engagement surface of the flange portion is in deforming engagement with a body panel of the vehicle; and,

(i) the flange portion being sufficiently deformable and having sufficient elasticity to effect a seal between the flange portion and the body panel and any decorative trim or the lie secured to the panel.

4,709,939

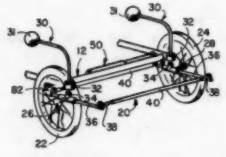
FRONT WHEEL CENTERING MECHANISM FOR WHEELCHAIRS

Raymond Stewart, 9026 Horley Ave., Downey, Calif. 90240

Filed Nov. 3, 1986, Ser. No. 925,967

Int. Cl.[4] B62M 1/14

U.S. Cl. 280—242 WC **12 Claims**



1. A wheelchair comprising a frame supporting a seat, a pair of rear wheels mounted in fixed orientation relative to said frame and having driving handwheels thereon, a linkage forming a parallelogram structure with hinged corners, a pair of front wheels mounted on said parallelogram structure in mutually parallel alignment and movable by said parallelogram structure in adjustable alignment relative to said rear wheels, steering means coupled to said parallelogram structure to selectively adjust the alignment of said front wheels, and a centering means for returning said front release of said steering means including a first member coupled to said parallelogram structure, a second member coupled to said frame in longitudinally offset, overlapping reciprocal fashion relative to said first member, and spring biasing means acting to urge said first and second, members toward relative longitudinal positions defining a predetermined distance of overlap.

4,709,940

STORAGE APPARATUS FOR HITCH AND HITCH TORSION BARS WHEN NOT IN USE

Jack L. Mishler, 6607 Avenue 396, Dinuba, Calif. 93618

Filed Oct. 23, 1986, Ser. No. 922,209

Int. Cl.[4] B60D 1/14

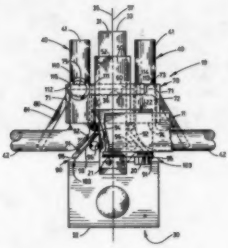
U.S. Cl. 280—405 R **10 Claims**

1. A storage apparatus for a detachable hitch assembly and a pair of spring bars, the apparatus mounting the detachable hitch assembly and the pair of spring bars on a supporting structure, the apparatus comprising:

a hitch receiving member that defines a channel which is adapted to receive in fixed relation therein the detachable hitch assembly, the hitch receiving member further having an outside surface, which mounts a bracket adapted to

be secured on the supporting structure, and a pin receiving station is formed in the hitch receiving member for receiving a locking pin, said locking pin adapted to secure the detachable hitch assembly in secure mating relationship internally of the hitch receiving member;

spring receiving members mounted on the outside surface adapted to receive and deploy the spring bars in a secured predetermined attitude; and



a pivotally mounted door mounted in close proximity to the channel of the hitch receiving member for releasably interlocking the spring bar in secure mating engagement with the spring receiving members, said pivotally mounted doors having a locking member mounted thereon that positions the pivotally mounted door in a closed attitude when the detachable hitch assembly is received in secure mating engagement internally of the hitch receiving member to prevent the removal of the spring bars from the spring receiving members.

4,709,941

TELESCOPIC ADJUSTING CRANK FOR TRACTOR 3-POINT HITCH

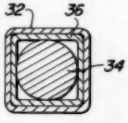
Werner Öbel, Ludwigshafen, and Klaus Zahn, Ostringen, both of Fed. Rep. of Germany, assignors to Deere & Company, Moline, Ill.

Filed Jun. 3, 1986, Ser. No. 870,194

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3519987

Int. Cl.⁴ A01B *63/118*

U.S. Cl. 280—461 A **3 Claims**



1. In a tractor having an operator's station and a 3-point hitch including draft links, lift arms, and lift links interconnecting the draft links and the lift arms, one of the lift links being adjustable in length by rotation of a part thereof, a variable length crank for the rotatable part of the adjustable lift link comprising: an upper tubular member having a non-circular interior, said upper member be mounted on the tractor for rotation in a position convenient to the operator station, a lower shaft having a lower end operatively connected to the rotatable part of the adjustable lift link, an upper portion of the shaft having an enlarged cross-section relative to the cross-section of the remainder of the shaft, said upper portion having an outer surface configuration complimentary to the interior of the upper member and be slidably engaged in the upper member.

4,709,942

SAFETY SKI BINDING INCLUDING AN AUTOMATIC COMPENSATION MECHANISM

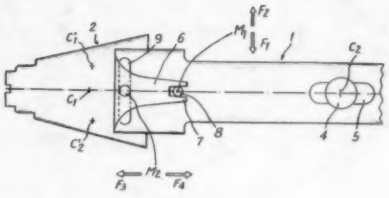
Jean-Pierre Dimier, Rumilly, and Pierre Rullier, Annecy, both of France, assignors to Salomon S.A., Annecy, France

Filed Mar. 11, 1985, Ser. No. 710,365

Claims priority, application France, Mar. 9, 1984, 84 03664

Int. Cl.⁴ A63C *9/081*

U.S. Cl. 280—618 **37 Claims**



1. A safety binding having a front abutment for holding the front of a boot on a ski and a vertical pivot wherein said binding comprises:

(a) an element positioned under said boot wherein said element is adapted to pivot around a substantially vertical axis passing through said vertical pivot and wherein said element is adapted to be displaced in translation on in the longitudinal direction of said binding with respect to said vertical pivot, wherein said element comprises:

(i) first means for linking said element to said front abutment, wherein said first linking means links said element to said front abutment during said longitudinal translational displacement of said element; and

(ii) second means for linking said element to said front abutment, wherein said second linking means links said element to said front abutment during said pivoting of said element around said vertical pivot, wherein said first and second linking means are distinct from one another.

4,709,943

KNEE PROTECTOR STRUCTURE FOR VEHICLE

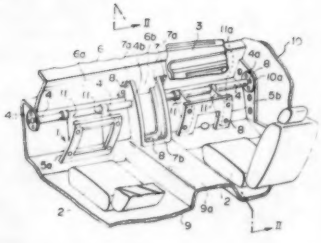
Toshiteru Yoshimura; Takayuki Kobayashi, and Masayoshi Ono, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan

Filed Jul. 15, 1986, Ser. No. 885,675

Claims priority, application Japan, Jul. 17, 1985, 60-158828; Jul. 24, 1985, 60-114287; Jul. 29, 1985, 60-117041; Jul. 29, 1985, 60-117042

Int. Cl.⁴ B60R *21/04*

U.S. Cl. 280—751 **28 Claims**



1. A knee protector structure for a vehicle comprising a transverse frame member extending in the transverse direction of the vehicle body below an instrument panel provided in front of the front of the front seat, bracket an upper portion of

which is connected to a body panel in front of the front seat substantially at the middle between right and left sides of the vehicle body and a lower portion of which is connected to the floor of the vehicle body, said frame member being connected to the cabside at an outer end portion and to the center bracket at an inner end portion, and a knee pad supported by a bracket member connected to the frame member at a front end portion and to the knee pad at a rear end portion, said bracket for supporting the knee pad comprising a first portion connected to the knee pad at a rear end portion and a second portion connected to the frame member at a front end portion, the first and second portions being connected together by a mounting member passed through a slit formed in one of the first and second portions.

4,709,944

STEERING WHEEL FOR VEHICLES

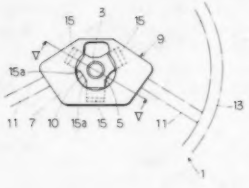
Suzuaki Hongo; Minoru Niwa, both of Ichinomiya; Takahiro Hashiba, Aichi; Mitsuru Harata, Nagoya; Ichiro Hirata, Gifu; Isamu Ito, Inazawa, and Akihiko Sonobe, Nagoya, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed May 8, 1986, Ser. No. 860,795

Claims priority, application Japan, May 9, 1985, 60-98821; May 9, 1985, 60-98822; Oct. 29, 1985, 60-242230

Int. Cl.[4] B62D *1/08;* **B60R** *21/02*

U.S. Cl. 280—777 **5 Claims**



1. A steering wheel for vehicles, comprising:

(a) a rim;

(b) two spokes each having a radially inner end and radially outer end, the two spoked having respective outer ends thereof secured to said rim thereby providing a spoke assembled body;

(c) a self-aligning plate connecting between said inner ends of said spokes and a boss, said self-aligning plate comprising a boss-fitting portion, a spoke-fitting portion and three plastically deformable arm portions arranged to extend in respective radial directions as a substantially Y-shaped array in an annular space formed between said boss-fitting portion and said spoke-fitting portion so as to interconnect said boss-fitting portion to said spoke-fitting portion;

(d) intermediate portions of said plastically deformable arm portions being curved;

(e) an intersection angle defined between the respective two adjacent said plastically deformable arm portions near the respective spokes mounted on said spoke-fitting portion being obtuse;

and

(f) one of said two spokes being connected to said self-aligning plate between a pair of adjoining ones of said deformable arm portions, and the other of said two spokes being connected to said self-aligning plate between another pair of adjoining ones of said deformable arm portions.

4,709,945

PRISMATIC CONNECTION MEMBER FOR THE SUPPLY OF VALVES OR THE LIKE

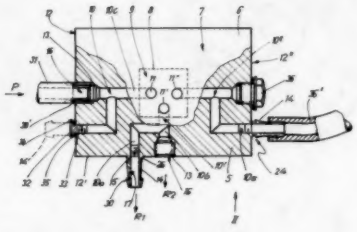
Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany

Filed Aug. 1, 1986, Ser. No. 892,509

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529276

Int. Cl.[4] F16L *39/00*

U.S. Cl. 285—4 **20 Claims**



1. In a connection member with a prismatic form adapted for having at least one valve mounted on it and having at least one duct therein, said duct extending from a first orifice at a valve mounting surface of the connection member adapted to carry such valve, to a second orifice on a connection side of the member, the improvement that at the connection side of said member the second orifice of the at least one duct in said connection member is in the form of both a socket with a female thread therein and a male nipple projecting from the connection side, both said socket and said nipple being connected with one of two sections of said at least one duct in said connection member to enable a length of pressure fluid lead to be connected with said male nipple and said socket alternatively at will.

4,709,946

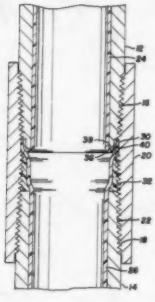
LINED PIPE JOINT

John J. Hunter, P.O. Box 3879, Abilene, Tex. 79603

Filed Feb. 20, 1987, Ser. No. 17,174

Int. Cl.[4] F16L *9/14*

U.S. Cl. 285—55 **3 Claims**



1. A pipe joint comprising:

(a) first pipe means having an external annular channel adjacent the end thereof and a continuous fluid impervious liner on the internal surface thereof extending around the end face of said first pipe means and into said external annular channel;

(b) second pipe means having a continuous fluid impervious liner on the internal surface thereof and extending from the end of said second pipe means; and

(c) sleeve means securing the ends of said first and second

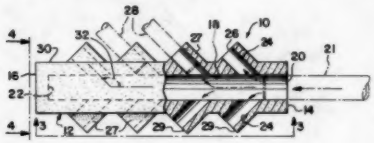
pipe means together, said sleeve means having an internal channel positioned in register with said external channel in said first pipe means and securing the end of the liner extending from said second pipe means within said internal channel and overlapping the liner in said external annular channel, whereby the end of said first pipe means and said sleeve means coact to radially compress the overlapped portions of said liners.

4,709,947

PLUMBING FITTING FOR A MULTIPLE-LINE CONNECTION

Donald L. Kniess, 124 Cedar Dr., West Milton, Ohio 45383

Filed Nov. 15, 1985, Ser. No. 798,651
Int. Cl.[4] F16L *41/00*
U.S. Cl. 285—150 **4 Claims**



1. A fitting for connecting a plurality of plumbing conduits, comprising:

an elongated, hollow body having first and second ends, said body being formed as a single piece;

said body defining a generally smooth outer surface, said body being square in cross section, said body thereby defining first and second opposed side walls along said outer surface, and having an inner central passageway extending from said first end to said second end;

said central passageway defining at said first end an inlet opening having a circular cross section, said central passageway further being closed at said second end;

said body further defining a plurality of branch passageways formed in a spaced relationship through said outer surface, each of said branch passageways opening through said outer surfaces at an outlet opening having a circular cross section, and opening into said central passageway;

a number of first ones of said branch passageways being defined through said first side wall and an equal number of second ones of said branch passageways being defined through said second side wall, said first and second branch passageways further being arranged symmetrically along said central passageway;

each of said first branch passageways being formed in parallel, each of said second branch passageways being formed in parallel; and

each of said first and second branch passageways defining an angle in cooperation with a portion of said central passageway extending from said branch passageway to said inlet opening of 135°.

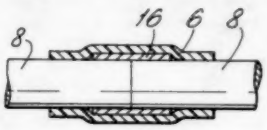
4,709,948

FIBRE REINFORCED POLYMERIC ARTICLE

Joel Archer, Nucourt; Denis V. Wassenhove, Crepy en Valois, both of France; Kenneth B. Pithouse, Swindon, England; Leslie J. Buck, Swindon, England; Jeffrey P. Molyneux, Swindon, England, and Peter S. Bradshaw, Swindon, England, assignors to Raychem Limited, England

Continuation-in-part of Ser. No. 767,300, Aug. 19, 1985, abandoned. This application Feb. 18, 1986, Ser. No. 830,387
Int. Cl.[4] F16L *25/00*
U.S. Cl. 285—381 **50 Claims**

1. A method of coupling two substrates comprising (a) positioning to bridge contiguous portions of the substrates a coupling assembly comprising a heat-recoverable tubular driver and telescoped with the driver tubular coupling means comprising substantially unconsolidated fibre reinforcement and heat-flowable polymeric material, and (b) applying heat to recover the driver and to cause the polymeric material to flow such that the recovering driver consolidates the coupling means, thereby coupling the substrates together, wherein the fibre reinforcement is provided by a braid and the fibres of the braid individually carry the polymeric material, which polymeric material has a sufficiently high softening temperature so that when the heat is applied to recover the driver the braid is caused to change its braid angle by slippage of the braid fibres at their cross-over points to conform to the shape of the recovering driver before further heating causes the polymeric material to flow such that the recovering driver consolidates the coupling means.

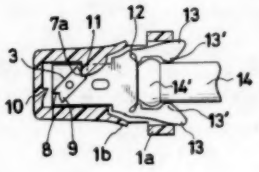


4,709,949

LATCH DEVICE

Takashi Umezawa, Sagamihara, and Koji Watanabe, Fujisawa, both of Japan, assignors to Nifco, Inc., Yokohama, Japan

Continuation of Ser. No. 626,984, Jul. 2, 1984, abandoned. This application Jun. 23, 1986, Ser. No. 877,710
Claims priority, application Japan, Jul. 6, 1983, 58-103889[U]
Int. Cl.[4] E05C *19/02*
U.S. Cl. 292—6 **16 Claims**



1. A latch system defined between a stationary support structure and a closure movably mounted upon said support structure between an open, unlatched position, and a closed, latched position, comprising:

a cylinder fixedly mounted upon said stationary support structure;

a strike fixedly mounted upon said closure;

a rod, having strike-engaging means disposed thereon, and movably mounted within said cylinder between a first, strike-released outer position, and a second, strike-clamped inner position;

first means disposed within said cylinder for biasing said rod toward said first, strike-released outer position;

means disposed within said cylinder for releasably retaining said rod, and therefore said strike and said closure, in said second, strike-clamped inner position, and said closed, latched position, respectively;

said strike being provided upon the leading end thereof with a radially expanded portion;

said strike-engaging means of said rod comprising a central, strike-engaging portion for contact engagement with said leading end of said strike when said closure, and said strike and rod, are moved from said open, unlatched, and first strike-released outer, positions, respectively, toward said closed, latched, and second strike-clamped inner, positions, respectively, against the biasing force of said first biasing means; and a pair of strike-engaging arms projecting outwardly from opposite sides of said said central,

strike-engaging portion for envelopingly engaging said radially expanded portion of said strike therebetween, said arms being mounted upon said central, strike-engaging portion of said rod for accommodation within said cylinder when said closure, and said strike and said rod, are moved from said open, unlatched, and first, strike-released outer, positions, respectively, toward said closed, latched, and second strike-clamped inner, positions, respectively; and

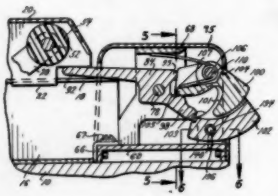
rotary cam means mounted upon said rod for cooperation with said retaining means of said cylinder when said rod is moved from said first outer position to said second inner position so as to retain said rod at said second inner position such that said strike-engaging means are engaged with said closure strike whereby said closure is disposed in said closed state, and for disengaging said retaining means of said cylinder when an inwardly directed force is applied to said closed closure whereby said rod is able to move from said second inner position to said first outer position under the influence of said first biasing means so as to permit said strike-engaging means to disengage said closure strike such that said closure can assume said open state.

4,709,950

CRASH BAR DOOR LOCKING DEVICE

Zedekiah Z. Zortman, Steeleville, Ill., assignor to American Device Manufacturing Co., Steeleville, Ill.

Filed Jun. 21, 1984, Ser. No. 623,032
Int. Cl.[4] E05B *65/10*
U.S. Cl. 292—92 **18 Claims**



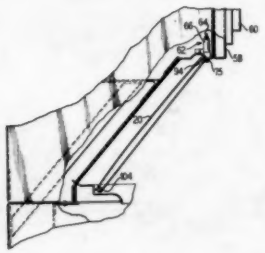
1. A door latch having a fire safety locking mechanism, to secure the latch in a locked position upon release of said safety lock mechanism, wherein the door latch has a latch bolt and a mounting bracket, the latch bolt having a transverse bore and the bracket having two transverse holes therein, the bracket being located on the door latch with the bore opening in alignment with the holes in the bracket, the latch bolt having two slidably received in the bore, each pin being biased against the other pin by a means for biasing located between the pins, the pins and the biasing means being retained in a compressed position by two plugs of fusible material frictionally engaged at either end of the bore to restrain the pins and biasing means in a compressed position out of engagement with the holes, whereby when the locking mechanism is exposed to heat sufficient to melt the fusible plugs, the pins are released and engage the holes in the bracket, securing the latch bolt in the locked condition.

4,709,951

OPEN LID LATCHING MECHANISM FOR AUTOMATIC WASHER

Harold S. Stacik, St. Joseph Township, Berrien County, and Warren R. Hafstrom, Lincoln Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Continuation of Ser. No. 551,970, Nov. 15, 1983. This application Mar. 21, 1986, Ser. No. 843,918
Int. Cl.[4] E05C *1/10*
U.S. Cl. 292—189 **9 Claims**



1. A combination washer/dryer wherein a dryer unit is positioned above a washer unit, a pivotal lid, having a free front edge, being attached to the washer unit and pivotable toward the dryer unit, a dryer cabinet having a bottom wall facing said pivotable lid with an opening therethrough and a latching mechanism, said latching mechanism comprising:

a single piece latch guide mounted in said dryer cabinet and having a vertical passage therein overlying said cabinet bottom wall opening;

a latch pin carried in said vertical passage for limited vertical movement and being continuously biased downwardly by gravity;

said latch pin having a bottom end which protrudes through said opening in said dryer bottom wall being manually accessible below said dryer bottom wall for manual manipulation and being engagable by said free front edge of said pivotable lid;

said latch pin being oriented so that rotation of the washer lid engages said protruding end of said latch pin urging it upwardly until said front edge rotates past said end, said latch pin then dropping by gravity to positively latch the lid in an open position returning said latch pin end to the manually accessible location.

4,709,952

CHOKER HOOK ASSEMBLY

John S. Selby, Puyallup, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

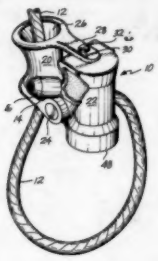
Filed Dec. 1, 1986, Ser. No. 936,526
Int. Cl.[4] B66C *1/38*
U.S. Cl. 294—82.14 **11 Claims**

1. A choker assembly of the type having a substantially closed body and a pivotally mounted latch arm on the outside of the body having an open position and a locked position where the locked position will capture and hold the end of a cable-ferrule combination running to the assembly, having the improvement comprising:

a first opening in the choker assembly where the latch arm is the the locked position defined by a portion of the surface on the body and a portion of the inside surface on the latch arm and having a size large enough to allow the ferrule to pass therethrough,

a second opening in the choker assembly where the latch arm is in the locked position adjacent the first opening defined by another portion of the surface on the body and a portion of the inside surface on the latch arm and having

a size small enough to prevent the ferrule from passing therethrough, and



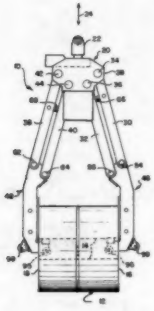
a gap between the first and second openings when the latch arm is in the locked position having a size to allow the cable to pass therethrough but not the ferrule.

4,709,953

ROLL HANDLING APPARATUS

Gabriel J. Sirota, Gibsonia, Pa., assignor to Amco Industries, Inc., Ford City, Pa.

Filed Dec. 13, 1985, Ser. No. 808,758
Int. Cl.[4] B66C *1/00*
U.S. Cl. 294—106 **23 Claims**



1. A lifting leg for a tong means for grasping a roll having a horizontal eye comprising:

a. a frame means;

b. guide means supported by said frame means for yieldingly contacting the end of said roll and or horizontal and vertical movement relative to said frame means from a rest position to a displaced position; and,

c. a horizontal lifting deck affixed to said frame means for engaging said horizontal eye.

4,709,954

HAND CARRYING DEVICE FOR GARMENT HANGERS

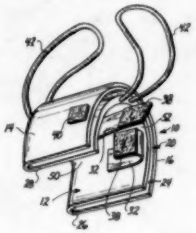
Marlee Beyda, and Marilyn Beyda, both of 8537 Alcott St., Los Angeles, Calif. 90035

Filed Jul. 14, 1986, Ser. No. 885,304
Int. Cl.[4] A45C *13/26*; A45F *5/10*
U.S. Cl. 294—142 **14 Claims**

1. A carrier for garment hangers of the type having a hook for suspending the hanger from a horizontal rod or the like, said carrier comprising:

a carrier body having a longitudinal axis and at least one lower edge extending between the two carrier body ends; and

a hanger receiving slot extending within said body along said axis, said slot having a substantially constant hook-shaped cross-section in a plane transverse to said longitudinal axis and being open at least at one of said body ends and along said lower edge said open lower edge communicating with said open end for laterally admitting and



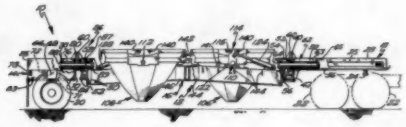
supporting a plurality of garment hanger hooks side by side along said axis such that the hangers associated with said hooks may be carried together suspended from said carrier body.

4,709,955

DEVICE FOR TRANSPORTING TREES AND THE LIKE

Douglas C. Peters, Chaska, and Charles S. Hansen, Eagan, both of Minn., assignors to Art Dahlquist, Burnsville, Minn.

Filed Feb. 6, 1987, Ser. No. 11,618
Int. Cl.[4] B60P *3/00*
U.S. Cl. 296—3 **15 Claims**



1. Trailer for transporting trees and the like comprising, in combination: a front frame section; a center frame section; a rear frame section, with the front frame section including means for connection to a powered vehicle, with the rear frame section including wheels for providing mobility along the travel surface; means for pivotably mounting the center frame section to the front frame section about a frame portion pivot axis; means for pivotably mounting the center frame section to the rear frame section about the frame portion pivot axis; at least a first pod for carrying the root ball of a tree and the like; means for pivotably mounting the pod to the center frame section about a pod pivot axis, with the frame portion pivot axis being perpendicular to the pod pivot axis; means for pivoting the pod about the pod pivot axis; and means for pivoting the center frame section about the frame portion pivot axis.

4,709,956

HANDY-CAP PICK-UP COVER

Lawrence S. Bowman, P.O. Box 779, Valley View, Pa. 17983

Filed Aug. 25, 1986, Ser. No. 900,290
Int. Cl.[4] B60P *3/42*
U.S. Cl. 296—100 **7 Claims**

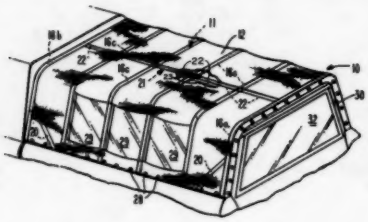
1. A cover assembly for the bed of a pick-up truck having side walls provided with top edges comprising, in combination;

a framework including a removable frame assembly and a pair of base rails permanently mounted on said side wall top edges,

said frame assembly including a pair of opposite end most and a plurality of intermediate inverted U-shaped frame members disposed in an upright spaced apart relationship

atop said base rails, angular braces joined between said end most frame members and said rails,

a locking bar comprising a plurality of adjacent tubular sections of rectangular stock each having respective end faces, hinge means joining at least certain of said locking bar section end faces in an opposed manner, opposed ones



of said end faces each provided with a semi-circular notch whereby,

adjacent ones of said semi-circular notches provide a circular opening surrounding respective ones of said intermediate frame members when said locking bar is in a longitudinal disposition to secure said frame members in a fixed relationship atop said base rails.

4,709,957

FRONT DOOR STRUCTURE FOR VEHICLE

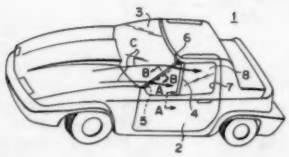
Takegi Ohya, Hiroshima, Japan, assignor to Mazda Motor Corporation, Japan

Filed Dec. 2, 1985, Ser. No. 803,554

Claims priority, application Japan, Dec. 4, 1984, 59-256697

Int. Cl.[4] B60J *1/00*

U.S. Cl. 296—146 **8 Claims**



1. A front door structure for a vehicle comprising an inner panel and an outer panel, a window sash having a closed cross section being formed by the inner panel and the outer panel wherein the window sash is divided into a front sash portion and a rear sash portion by a vertical dividing member, a windowpane is fixedly bonded to the front sash portion by bonding means to cover at least the windshield side edge portion of the front sash portion and the front sash portion is provided with at least one air discharge opening which is adapted to be communicated with an air duct of an air conditioner unit provided in the vehicle way of the interior of the window sash and opens toward the windowpane, means defining a space formed along said outer panel of the front sash portion between the outer panel and a forward portion of said windowpane and a connecting portion formed by said bonding means between the outer panel and a front edge portion of the forward portion of said windowpane, said space being formed rearward of said connecting portion, an air passage in the front sash portion communicating with said space between the outer panel and the forward portion of the windowpane via said at least one air discharge opening which opens into the outer panel so that air flows into said space through the at least one air discharge opening, hits an inner surface of the forward portion of the windowpane and disperses rearward of the at least one air discharge opening by rearward flow.

4,709,958

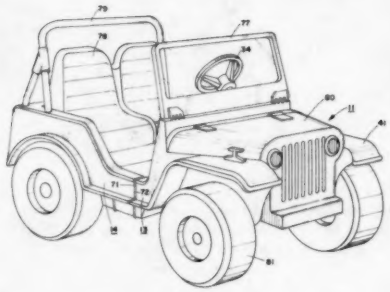
RIDABLE VEHICLE AND ASSEMBLY METHOD

Lawrence R. Harrod, Fort Wayne, Ind., assignor to Kransco Manufacturing, Inc., San Francisco, Calif.

Filed Sep. 22, 1986, Ser. No. 910,019

Int. Cl.[4] B62D *25/08*; B62K *9/00*

U.S. Cl. 296—177 **7 Claims**



1. A child's ridable vehicle comprising, in combination;

first and second complementary plastic body portions;

one of said body portions being the front and the other of said body portions being the rear of a body for a child's vehicle;

a frame including first and second longitudinal frame members each with an intermediate portion;

first and second inverted generally U-shaped sill portions on said first body portion adapted to overlie the intermediate portion of said first and second longitudinal frame members, respectively;

first and second inverted generally U-shaped sill portions on said second body portion adapted to overlap and be complementary to said first body portion sill portions;

an alignment aperture in each said sill portion; and

fasteners securing said overlapped sill portions to said frame at said alignment apertures.

4,709,959

SLIDING AND LIFTING ROOF

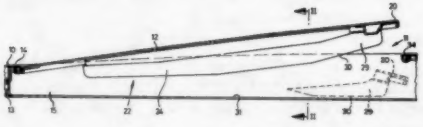
Jochen Paerisch, Herrenberg; Werner Herlemann, Aidlingen, and Walter Schaetzler, Stockdorf/Gauting, all of Fed. Rep. of Germany, assignors to Webasto-Werk W. Baier GmbH & Co., Gauting and Daimler-Benz AG, Stuttgart, both of, Fed. Rep. of Germany

Filed Nov. 21, 1985, Ser. No. 800,409

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1984, 3442616

Int. Cl.[4] B60J *7/22, 7/05*

U.S. Cl. 296—217 **21 Claims**



1. Sliding and lifting roof for vehicles of the type having a rigid cover, which in a closed position closes a roof opening in a fixed roof surface, and therefrom, is selectively tiltable upwardly so as to raise a rear edge of the cover above the fixed roof surface, and lowerable for sliding displacement below the fixed roof surface, comprising a frame encircling at least part of the roof opening, said frame forming a rain gutter extending below opposite sides of the roof opening; and a strip-shaped shield element arranged at each of said sides of the cover so as to be essentially normal to the cover surface and substantially

flush with its edge, wherein a lower portion of each shield element is of a material sufficiently flexible to deform upon contact with said gutter or other fixed structure of the roof and the shield elements are fixedly connected with the cover along upper edges thereof, and wherein at least a major portion of a longitudinal extent of each lower portion laterally bears against a respective side edge of the roof opening when the cover is tilted upwardly, and wherein the flexible portion of each strip-shaped shield element is an extension of the strip-shaped shield element that is disposed so as to extend parallel to a plane within which the shield element is displaceable.

4,709,960

RECLINABLE CHILDREN'S CHAIR

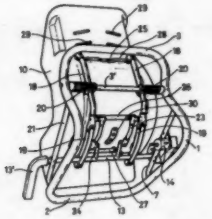
Joaquín J. Launes, Barcelona, Spain, assignor to Play, S. A., Spain

Filed Apr. 17, 1986, Ser. No. 852,993

Claims priority, application Spain, Apr. 24, 1985, 286732; Jun. 12, 1985, 287,400

Int. Cl.[4] A47D *1/10*

U.S. Cl. 297—250 **8 Claims**



1. Reclinable children's chair for use as a portable chair on a vehicle seat in a motor vehicle, comprising

a base frame adapted to be placed on such a vehicle seat, and a reclinable child's seat operatively slidably and guidably engaged with and supported by the base frame and movable generally longitudinally back and forth relative to the base frame selectively angularly between an upright rearward position and a reclined forward position,

guide frame supports interlocked to the base frame, and a generally vertically arcuate guide frame attached to the reclinable seat for movement therewith and guidably engaged with and supported by the guide frame supports,

a rotatable transverse drive shaft mounted on the base frame and a connecting rod linkage operatively connecting the shaft to the reclinable seat for so moving the reclinable seat upon corresponding rotation of the shaft and including radial crank arm means on the shaft and connecting rod means correspondingly operatively connected at one end to the arm means and at the other end to an intermediate portion of the guide frame for transmitting rotational motion of the shaft as longitudinal motion to the reclinable seat,

limit means for limiting the movement of the reclinable seat between two opposing operative end positions corresponding to the upright and reclined positions of the reclinable seat and including generally longitudinal slot means in the guide frame provided with opposing forward and rearward slot end stop means, the shaft being arranged in the slot means for independently guidably engaging and supporting the guide frame thereat,

such that upon reclinable seat rearward movement to the upright rearward position, the forward slot end stop means will abut the shaft to limit further rearward seat movement, and in turn upon reclinable seat forward movement to the reclined forward position, the rearward slot end stop means will abut the shaft to limit further forward seat movement, and further

such that the guide frame supports and shaft on the base frame correspondingly guidably engage and support the guide frame and slot means in any position of movement of the reclinable seat, and

means for rotating the shaft.

4,709,961

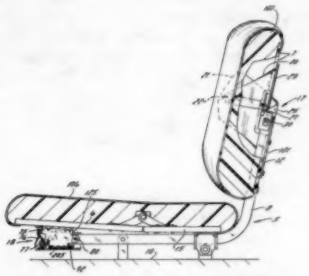
SELF-RELEASING RATCHET-TYPE SEAT ADJUSTMENT

Kevin E. Hill, Milwaukee, Wis., assignor to Milsco Manufacturing Company, Milwaukee, Wis.

Filed Sep. 29, 1986, Ser. No. 912,495

Int. Cl.[4] A47C *3/00, 7/46*

U.S. Cl. 297—284 **4 Claims**



1. In a seat comprising a relatively stationary frame element and a seat element which is swingable in opposite adjustment directions between a pair of defined limits about an adjustment axis that is fixed in relation to the frame element and which is normally urged in one of said directions by its support of an occupant of the seat, adjustment means comprising ratchet means consisting of a ratchet member cooperable with a pawl member for holding said seat element against swinging in said one direction out of each of a plurality of defined adjustment positions to which it can be swung in the opposite adjustment direction, and a latch member cooperating with said ratchet means to provide for substantially free swinging of the seat element in said one direction to one of said limits in consequence of its being swung in said opposite direction to the other of said limits, said adjustment means being characterized by:

A. one of said members of the ratchet means being fixed to one of said elements;

B. the other of said members of the ratchet means

(1) being confined to movement relative to the other of said elements in opposite ratcheting directions towards and from said one member that are substantially transverse to said adjustment directions, and

(2) being biased in the ratcheting direction towards said one member for ratcheting engagement with it; and

C. said latch member being carried by said other of said elements and confined to motion relative thereto in substantially said adjustment directions between defined latching and release positions;

D. said latch member having means fixed thereon defining a first pair of abutments and said one of said elements having means fixed thereon defining a second pair of abutments, said abutments of each pair being arranged to cooperate with those of the other pair in defining a lost motion connection between said latch member and said one of said elements whereby the latch member is moved to a release position and to a latching position, respectively, by movement of the seat element to its said one limit and to its said other limit;

E. said latch member and said other member of the ratchet means having cooperating driving surfaces

(1) which are spaced apart when the latch member is in its release position,

(2) which are engaged during motion of the latch member to its latching position, and

(3) through which the latch member by that motion drives said other member of the ratchet means to a disabled position in which it is spaced from said one member of the ratchet means; and

F. cooperating latch member restraining means on said latch member and on a part carried by said other of said elements, said latch member restraining means being arranged

(1) to be disengaged when the latch member is out of its latching position, but

(2) to be engaged under the bias of said other member of the ratcheting means when the latch member is in its latching position, and

(3) when engaged to releasably restrain the latch member against movement out of its latching position while the latch member retains said other member of the ratcheting means in its disabled position.

4,709,962

WORK CHAIR WITH A TILTING MECHANISM FOR SEAT SQUAB AND BACKREST

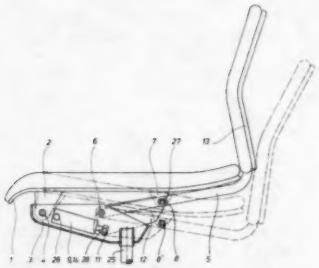
Joachim Steinmann, Meersburg, Fed. Rep. of Germany, assignor to Kloeber GmbH & Co., Fed. Rep. of Germany

Filed Oct. 24, 1985, Ser. No. 790,933

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 3438901; Oct. 24, 1984, 3438902

Int. Cl.[4] A47C *1/032*

U.S. Cl. 297—301 **7 Claims**



1. A work chair having a seat carrier, a seat squab having a front edge and a rear edge, a backrest carrier with a backrest and a lever arm extending from said backrest, a first pivotal connection being formed by a first axle adjacent the front edge for securing the seat squab to the seat carrier, a second pivotal connection being formed by a second axle securing a free end of the lever arm of the backrest carrier to the seat carrier, a third pivotal connection between the seat squab and backrest carrier, said third pivotal connection being formed by a third axle connecting said lever arm inward of the free end thereof to the rear edge of said seat squab with a loose connection having play so that the seat squab and backrest will pivot interdependently in the same direction, load element means for pivoting the seat squab and the backrest carrier into a position of rest under spring loading, said load element means comprising two parallel extending compression springs with a hydraulic locking element means disposed therebetween for adjusting the linear extension of each of said two springs, one end of the load element means being pivotally connected to a free end of the lever arm of the backrest carrier and the other end of the load element means being connected to the squab seat adjacent the first pivotal connection.

4,709,963

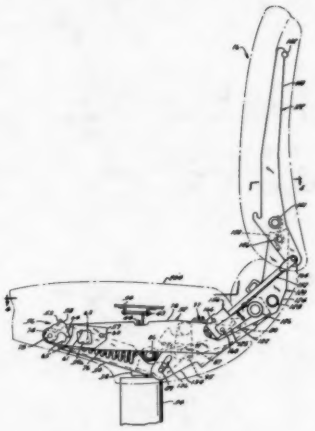
ADJUSTABLE OFFICE CHAIR

Ronald T. Uecker, Slinger, and Steven D. Slicker, Mequon, both of Wis., assignors to MILSCO Manufacturing Company, Milwaukee, Wis.

Filed Dec. 12, 1986, Ser. No. 940,953

Int. Cl.[4] A47C *1/02*

U.S. Cl. 297—316 **22 Claims**



1. A chair comprising:

a base assembly **(12)**;

a seat assembly **(14)**;

a backrest assembly **(16)**;

connecting means to enable movement of at least one of said seat assembly **(14)** and said backrest assembly **(16)** from one position to another position relative to said base assembly **(12)** in response to force exerted by a chair occupant;

means to apply a biasing force to bias said one assembly **(14,16)** toward said one position and against the force exerted by said chair occupant during movement of said one assembly **(14,16)** from said one position to said another position,

said means comprising:

at least one preloaded biasing spring **(76)** connected to said base assembly **(12)** and which is preloaded to exert a predetermined biasing force,

and force transmitting means **(87, 94, 95)** connected to said biasing spring **(76)** and to said one assembly **(14, 16)** for transmitting biasing force from said preloaded biasing spring **(76)** to said one assembly **(14, 16)**;

and adjustable means **(97, 100)** operable upon said force transmitting means **(87, 94, 95)** to change the biasing force acting on said one assembly **(14, 16)** without changing said predetermined biasing force exerted by said biased spring **(76)**.

4,709,964

VEHICLE REAR SEAT

Yasuyuki Seura, Ayase, Japan, assignor to Ikeda Bussan Co., Ltd., Kanagawa, Japan

Filed Mar. 5, 1986, Ser. No. 836,479

Claims priority, application Japan, Mar. 22, 1985, 60-39858[U]

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—354 **6 Claims**

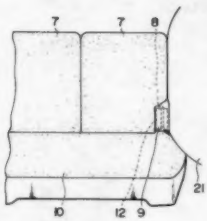
1. A rear seat located at a rear portion of a vehicle, including:

a pair of cushions, one of said cushions being a cushioned

seat back, including a recess formed a a lower bottom of a side thereof;

the other of said cushions being a seat cushion, one of said cushions being reclinable relative to the other;

a reclining device located in said recess;



a side finisher attached to a side of said vehicle and including a cover piece attached thereto; and

wherein said cover piece extends from said side finisher across a front side of said recess, said cover piece shielding said reclining device located in said recess.

4,709,965

SEAT RECLINING APPARATUS

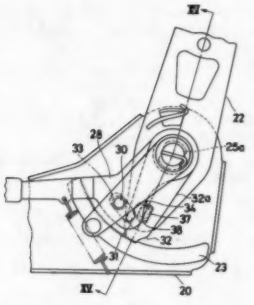
Kenichi Kazaoka, Nagoya, and Hiroshi Okazaki, Toyota, both of Japan, assignors to Aisin Seiki Kabushika Kaisha, Japan

Filed May 11, 1984, Ser. No. 609,116

Claims priority, application Japan, Jun. 13, 1983, 58-105451

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—366 **7 Claims**



1. An apparatus for adjusting the inclination of a backrest of a vehicle seat having a seat cushion comprising:

a lower bracket for supporting the seat cushion;

an upper bracket for supporting the backrest;

hinge means mounted on said lower bracket for rotatably supporting said upper bracket;

means mounted on said upper bracket for slidably connecting said upper bracket to said hinge means, wherein said slidably connecting means includes a sleeve member having an elongated slot disposed about said hinge means;

an operating lever rotatably mounted on said sleeve member and biased in a first direction;

means extending between said upper bracket and said hinge means for biasing said upper bracket in said first direction;

first engaging means spaced radially from said hinge means on said lower bracket and extending along a curve, wherein said curve comprises an arc of a circle centered at said hinge means;

second engaging means projecting from said upper bracket for cooperating with said first engaging means to hold said upper bracket at the desired inclination; and

means for releasably locking said first engaging means into fixed engagement with said second engaging means, said locking means including a locking plate fixedly attached to said hinge means and having a projection mounted thereon, said locking means also including an elongated groove extending along said operating lever for receiving said projection, wherein rotation of said lever slidably moves said groove along said projection enabling said second engagement means to be selectively positioned in a lock position and in a release position, said first and second engaging means being engaged in said lock position and disengaged in said release position to allow adjustment of the inclination of the backrest.

4,709,966

PROTECTIVE DEVICE

James G. Parkinson, Safia Place, Tankfield Paget 6-15, Bermuda, and Thomas P. Kirsten, 99 Joao Alvares Soares, CEP 04609, San Paulo, Brazil

Filed Jun. 17, 1986, Ser. No. 875,280

Claims priority, application Brazil, Jun. 17, 1985, 6500811[U]

Int. Cl.[4] B60R *22/12*; A62B *35/00*

U.S. Cl. 297—473 **4 Claims**

1. A protective device for providing limited movement of a child traveling in a vehicle comprising

a seat anchoring belt assembly having a generally vertically extending closed loop, said loop being adapted to encircle a portion of the seat of the vehicle to prevent movement of said belt relative to the seat;

said belt operatively engaging a child restraining harness adapted to be positioned around the upper torso of a child, said harness including a single child encircling belt assembly and a shoulder strap assembly;

said child encircling belt assembly having a front portion and a rear portion and extending circumferentially about the chest or abdomen of the child and beneath the arms of the child;

said shoulder strap assembly including a pair of straps, each of said straps including a first and second end respectively affixed to said front and rear portions of said belt assembly;

said shoulder straps being arranged in crossover relation such that the right rear and the left front portions of said belt are connected by one of said shoulder harness straps and the right front and the left rear portions of said belt are connected by the other of said shoulder harness straps;

said pair of shoulder straps arranged in crossover relation being free to separately move in a longitudinal direction with respect to each other;

a single free-floating coupling ring receiving and positioning respectively portions of said seat anchoring belt and said shoulder harness strap assembly to permit limited movement of said child restraining harness with respect to said anchoring belt thereby permitting limited movement of the child restrained within said device; and

said coupling ring securing said shoulder straps in said crossover relation while at the same time permitting said longitudinal movement of said straps with respect to each other.

4,709,967

WHEEL CAP

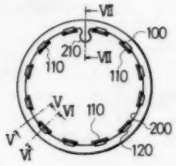
Fujio Sakamoto, Nagoya, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Dec. 11, 1985, Ser. No. 807,583

Claims priority, application Japan, Dec. 14, 1984, 59-190594[U]; Dec. 20, 1984, 59-193699[U]

Int. Cl.[4] B60B *7/06*

U.S. Cl. 301—37 P 7 Claims



1. A wheel cap adapted to be mounted to a wheel disk so as to cover at least a portion thereof, by engagement with an inner peripheral surface of an axially accessible face of the wheel disk, said wheel cap comprising:

a circular disk form base part;

a plurality of axially extending, circumferentially spaced engaging parts which are elastically deformable in a radial direction relative to said base part, said engaging parts being disposed on a circumferential part of said base part and arranged to be engaged with said inner peripheral surface of a wheel disk when said wheel cap is mounted to said wheel disk;

a plurality of stopper parts disposed along the circumferential direction of the circumferential part of said base part and each comprising a stopper surface arranged to be opposed to the inner peripheral surface of said wheel disk with a gap usually existing between said stopper surfaces of said stopper parts and the inner peripheral surface of said wheel disk when said wheel cap is mounted to said wheel disk, but being arranged for temporarily coming into contact with said inner peripheral surface when said base part is temporarily strongly pressed against the inner peripheral surface of said wheel disk; and

a ring holder held by said engaging parts and urging said engaging parts radially outwards into resilient engagement with said inner peripheral surface of said wheel disk, said ring holder being an endless annular member which includes an arc portion adapted to engage with said engaging parts and a looped flexible portion which extends between and joins angularly spaced sites on said arc portion in such a manner that the looped flexible portion extends radially inwards from the circumference of an imaginary circle on which said arc portion lies, the looped flexible portion and the arc portion being curved about respective axes which are substantially parallel to one another.

4,709,968

FLUID PRESSURE CONTROL APPARATUS FOR REDUCING SWING OR FALL OF VEHICLE BODY DUE TO BRAKING DURING BACKWARDS RUNNING OF VEHICLE

Ryuichi Tanaka, and Akira Ishii, both of Kanagawa, Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed May 12, 1986, Ser. No. 862,043

Claims priority, application Japan, May 17, 1985, 60-73030[U]

Int. Cl.[4] B60T *13/00*

U.S. Cl. 303—6 C 9 Claims

1. A fluid pressure control apparatus for a vehicle comprising:

(A) an inlet port connected to a master cylinder;

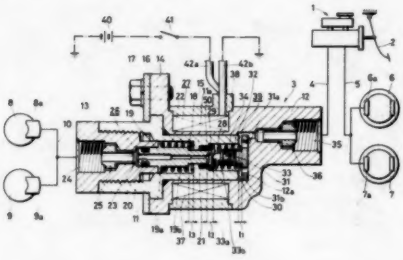
(B) an outlet port connected to a wheel cylinder of a brake apparatus for a front wheel;

(C) a valve apparatus arranged in a path connecting said inlet and outlet ports;

(D) a movable plunger for closing and opening said valve apparatus, receiving fluid pressure at both sides;

(E) a first spring for urging said plunger in the direction to open said valve apparatus;

(F) an electromagnetic coil to be energized by a signal transmitted on the basis of the driver's operation for driving said vehicle backwards;



(G) said valve apparatus including a valve body which can be separated from and seated on a valve seat formed on said plunger;

(H) a second spring for urging said valve body to the first position where said valve body cannot contact with said valve seat of the plunger in spite of movement of said plunger; and

(I) said valve body being moved by energization of said electromagnetic coil to the second position where said valve body can contact with said valve seat of the plunger with movement of said plunger.

4,709,969

BRAKE PRESSURE BOOSTER IN VEHICLE BRAKE SYSTEMS

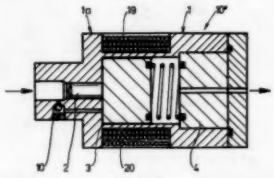
Gerhard Heess, Tamm, and Anton van Zanten, Ditzingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 23, 1986, Ser. No. 887,302

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526192

Int. Cl.[4] B60T *8/32, 13/74*

U.S. Cl. 303—114 15 Claims



1. A brake pressure booster in vehicle brake systems, in combination with an anti-skid system for realizing anti-skid functions, which comprises a housing (1), a pressure chamber (5) in said housing, an inlet (11) in said housing to which a brake pressure from a master brake cylinder is connectable, an outlet (15) which is connectable with an associated wheel brake cylinder, a potential energy means (3) in said pressure chamber so embodied that with increasing or decreasing brake pressure from said master brake cylinder to said inlet, the storage of potential energy increasing simultaneously in one or

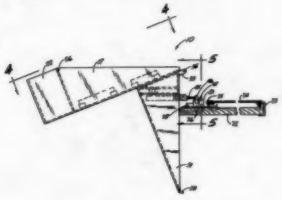
another direction is transferred for raising or lowering pressure applied from said brake pressure booster to the wheel brake cylinder, wherein the booster includes a fixed permanent magnet (4) and said potential energy means is a moveable permanent magnet (3) having a varying distance with respect to said fixed permanent magnet (4) and which is displaceably supported in said pressure chamber (5).

4,709,970

PORTABLE CABINET

Neil A. Savoie, 22 Pelham Rd., Hudson, N.H. 03051

Filed Oct. 9, 1986, Ser. No. 917,362
Int. Cl.[4] A47B *47/02*
U.S. Cl. 312—140.4 **8 Claims**



1. A portable cabinet comprising:

a first assembly having a floor member, first and second sidewall members connected to the floor member and a rear wall member connected to the floor member and to said first and second sidewalls;

a second assembly having a top wall, third and fourth sidewalls connected to said top wall and a front wall connected to said top wall and to said third and fourth sidewalls;

means for pivotally attaching a bottom portion of said front wall of the second assembly to a front portion of the floor member of said first assembly for permitting said second assembly to pivot between a first position closing the portable cabinet and a second position wherein the cabinet is open;

a shaft;

means for selectively movably attaching said shaft to the third and fourth sidewalls of said second assembly for permitting said shaft to move in a first direction towards or away from said top wall;

an arm;

means for slidably attaching one end of said arm onto said shaft whereby said arm is movable in a second direction which is perpendicular to the first direction of movement of said shaft;

means for selectively attaching the other end of said arm to a stationary object; and

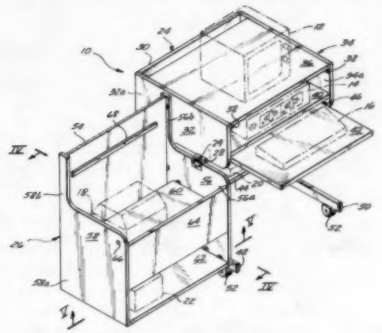
means attached to said second assembly for selectively holding said arm and shaft in one of a number of pre-selected positions to selectively limit movement of said second assembly relative to said arm and shaft in said first direction; wherein, said means attached to said second assembly includes a downwardly extending projection connected to the other end of said arm and a threaded rod means connects said downwardly extending projection to said arm for extending or shortening the effective length of said arm.

4,709,971

COMPUTER WORK STATION

Richard Leeds, Lawrence, and Arthur Roberts, Westbury, both of N.Y., assignors to Global Equipment Company, Hempstead, N.Y.

Filed Nov. 12, 1985, Ser. No. 796,802
Int. Cl.[4] A47B *21/03*
U.S. Cl. 312—201 **17 Claims**



1. A computer work station for use with a computer system, comprising:

a desk section having first and second side panels, a rear panel, and a first support surface between said first and second side panels for supporting a first component of said computer system;

said first and second side panels being solid and having a substantially inverted L shape;

said rear panel being substantially solid;

an auxiliary section having third and fourth side panels, a front panel and a second support surface for supporting a second component of said computer system;

said third and fourth side panels being solid and having a substantially L shape, said L shape having a substantially complementary shape to said inverted L shape;

said front panel being substantially solid;

coupling means hingedly interconnecting said desk and auxiliary sections about a vertically disposed pivot axis for pivoting horizontal movement of said auxiliary section relative to said desk section between an open position and a closed position;

said front panel and said rear panel extending substantially a full height of said computer work station;

said complementary shape, when said auxiliary section is in said closed position, permitting said sections to fit together to form a substantially enclosed structure with said front and rear panels constituting the front and rear closed walls thereof, said first and third end panels forming a first side thereof and said second and fourth end panels forming a second side thereof; and

one of said first and second support surfaces being disposed above the other thereof within said enclosed structure when said auxiliary section is in said closed position.

4,709,972

KEYBOARD CABINET WITH SLIDING TRAY

Brian R. LaBudde, Greece, and Kevin C. Koek, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 27, 1986, Ser. No. 900,929
Int. Cl.[4] A47B *21/03*
U.S. Cl. 312—208 **10 Claims**

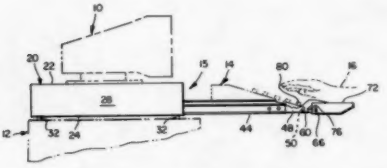
1. A work station cabinet for keying entries into a keyboard, the work station cabinet comprising:

a housing having an opening in a front face thereof;

a tray means having a surface for supporting the keyboard;

means coupling the tray means and the housing for movement of the tray means through the front face of the housing to an extended position wherein the keyboard is outside the housing and accessible for keying of entries thereinto, and to a retracted position wherein the keyboard is located within the housing for storage;

a door pivotably connected to the tray means, the door having a front face and a rear face, the rear face cooperating with the housing to seal the front face of the housing when the tray means is in its retracted position when the door is pivoted to a generally vertical orientation; and



means for supporting the door so that the rear face is in a generally horizontal orientation while the tray means is in its extended position, the rear face of the door being elevated relative to said surface of the tray means, without overlying the surface of the tray means, and providing support for the hands or wrists of an operator for keying entries into the keyboard.

4,709,973

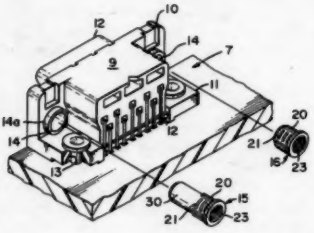
INSERT RETENTION MEMBERS FOR CONNECTORS

Mark H. Waters, Harrisburg, and Robert N. Whiteman, Jr., Middletown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 20, 1986, Ser. No. 876,569

Int. Cl.[4] H05K *1/00;* **F16B** *13/06*

U.S. Cl. 439—78 **10 Claims**



1. A retention member for a dielectric housing such as an insert retention member, comprising:

a flange;

a shank interconnected with said flange;

an aperture in said shank and said flange for securing a screw device and the like within the same, said shank further including a plurality of longitudinal antitorque retention means, each of said longitudinal antitorque retention means extending along an outer surface of said shank, upstanding therefrom and being spaced apart from its adjacent longitudinal antitorque retention means in at least one segment peripheral to said outer surface of said shank; and

a plurality of transverse retention means extending along said outer surface of said shank and upstanding therefrom, said transverse retention means being spaced apart from each other and spaced from adjacent said longitudinal antitorque retention means within said at least one segment of said shank.

4,709,974

BATTERY CONNECTOR

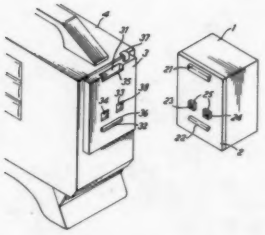
Clive F. J. Hawkins, Raynes Park, Great Britain, assignor to PAG Limited, London, United Kingdom and PAG America Ltd., Asheville, N.C.

Filed Mar. 24, 1986, Ser. No. 843,375

Claims priority, application United Kingdom, Oct. 15, 1985, 8525339

Int. Cl.[4] H01R *13/639*

U.S. Cl. 439—345 **8 Claims**



1. A connector unit for connecting two electrical devices together, the connector unit comprising:

a first connector element and a second connector element, said first and second connector elements being complementary to one another; said first connector element being for attachment to one of the two electrical devices and said second connector element being for attachment to the other of the two electrical devices;

said first connector element including:

a first plate;

at least one upper claw attached to said first plate;

at least one lower claw attached to said first plate; and

at least one first electrical connection connected to said first plate;

said second connector element including:

a second plate having an upper edge and a lower edge;

at least one recess defined in said upper edge of said second plate for receiving said at least one upper claw of said first plate to form an elongated hinge means for allowing hinging movement between said first and second plate, said first plate being hangable from said second plate upon receipt of said at least one upper claw by said at least one recess;

at least one slot defined in said second plate for receiving said at least one lower claw of said first plate when said recess receives said at least one upper claw of said first plate;

at least one second electrical connection connected to said second plate for coupling with said at least one first electrical connection of said first plate when said recess receives said at least one upper claw and said slot receives said at least one lower claw; and

locking means associated with said slot for locking said lower claw within said slot.

4,709,975

RELEASABLE SNAP CONNECTOR

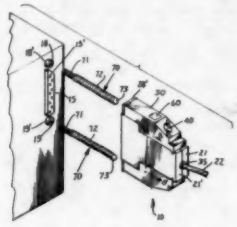
Joseph R. Williams, II, 5296 Amhurst, Norcross, Ga. 30092

Continuation of Ser. No. 532,679, Sep. 16, 1983, Pat. No. 4,589,716. This application Jul. 29, 1985, Ser. No. 760,147

The portion of the term of this patent subsequent to May 20, 2003, has been disclaimed.

Int. Cl.⁴ H01R *13/627*

U.S. Cl. 439—350 **3 Claims**



1. A self-locking, releasable connector for a plug and socket, comprising:

a plug;

a socket configured to receive said plug;

an elongate member defining a first end portion and a second end portion, said first end portion being formed for attachment to one of said socket and said plug, and said second end portion being formed with external ribs and extending outwardly of said first end portion; and

an adapter member comprising an internal passageway and means for attaching said adapter member to the other of said plug and said socket so as to receive freely said elongate member within said passageway upon engagement of said plug and said socket,

said adapter member further comprising a pair of inwardly biased hinge plates mounted for pivotal movement about said internal passageway and configured to define an opening therebetween so as to yieldingly receive said elongate member, and means for selectively separating said inwardly-biased hinge plates,

whereby, upon insertion of said elongate member into said passageway, said inwardly-biased hinge plates capture said second end portion of said elongate member so that said plug is positively interlocked with said socket and, upon activation of said separating means, said hinge plates release said second end portion of said elongate member such that said plug is released from connection with said socket.

4,709,976

CONNECTOR BUILT FROM ONE OR MORE SINGLE ROWED HOUSINGS WITH LONG LASTING LOCKING MECHANISM

Katsuhiko Nakama, Nagaokakyo; Hiroshi Ninomiya, Uji; Toru Michishige, Nagaokakyo, and Fumiaki Itsuki, Ibaraki, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Jan. 28, 1986, Ser. No. 823,329

Int. Cl.⁴ H01R *13/62*

U.S. Cl. 439—350 **3 Claims**

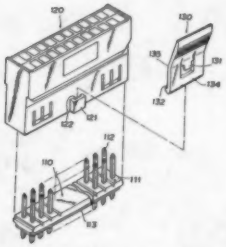
1. An electric connector for engaging with a fixed base, comprising a main housing formed with a catch fitting projection on at least one side thereof and defining an engagement aperture, and a lock mechanism for locking said main housing to said fixed base and comprising a catch piece formed with:

a main body which is bent at an intermediate portion thereof;

a manually pressable portion formed on a first end portion of said main body;

an engaging portion formed on a second end portion of said main body opposite to said first end portion, said bent intermediate portion being located between said first and second portions, said engaging portion being formed with a catch shape for engaging with said fixed base; and

an elastic fixing tongue engagable into said engagement aperture so as to elastically support said catch piece on the side of said main housing with said bent portion pressing



against said main housing and acting as a fulcrum, and in this state biasing said manually pressable portion in the direction away from said main housing and said engaging portion in the direction towards said main housing whereby said catch is engagable with said base.

4,709,977

CONTROLLABLE DIRECTIONAL COUPLER

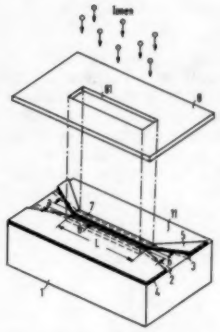
Franz Auracher, Baierbrunn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 16, 1985, Ser. No. 723,874

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420580

Int. Cl.⁴ G03B *6/10*

U.S. Cl. 350—96.14 **13 Claims**



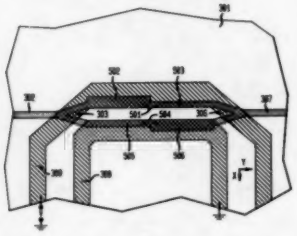
1. In a controllable directional coupler of the type in which a pair of light waveguides extend parallel to one another for a length L at a surface of a substrate of electro-optical material defining an interstice therebetween, and in which a control electrode structure is carried on the surface of the substrate and comprises a pair of spaced control electrodes respectively positioned over respective ones of said waveguides, the improvement therein comprising:

a zone in the interstice having a lower refractive index down to a predetermined depth with respect to the remainder of the substrate, whereby the lower refractive index and the predetermined depth are selected such that a cross over between the two wave guides still occurs.

4,709,978
MACH-ZEHNDER INTEGRATED OPTICAL MODULATOR

Janet L. Jackel, Holmdel, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Feb. 21, 1986, Ser. No. 831,607
Int. Cl.[4] G02B 6/10; G02F 1/00
U.S. Cl. 350—96.14 **9 Claims**

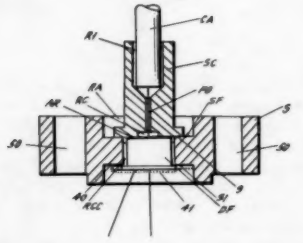


1. An optical interferometric modulator comprising
an input waveguide section
an input branching section for dividing an optical signal on said input section into two substantially equal portions,
first and second branch waveguides for transmitting the two portions of the divided optical signal,
first and second electrodes each associated with said first and second branch waveguides, respectively, and each in a proximate physical relationship with its associated branch waveguide along a modulation length,
an output branching section for combining the optical signals on said first and second branch waveguides, characterized in that
said first and second branch waveguides are disposed in such a proximate physical relationship with each other along the modulation length to maximize the field overlap between the electric fields from said first and second electrodes and the optical field in the branch waveguides, and
said modulator further comprises means for optically decoupling said first and second branch waveguides.

4,709,979
SYSTEM FOR THE CONNECTION OF PHOTODETECTORS TO OPTICAL FIBERS

Fabrizio Spodati, Ospitaletto Di Cormano Milan, and Mario Tamburello, Milan, both of Italy, assignors to Telettra-Telefonia Elettronica e Radio S.p.A., Italy

Filed Oct. 22, 1984, Ser. No. 663,240
Claims priority, application Italy, Nov. 4, 1983, 23587 A/83
Int. Cl.[4] G02B 6/36, 7/26
U.S. Cl. 350—96.20 **7 Claims**

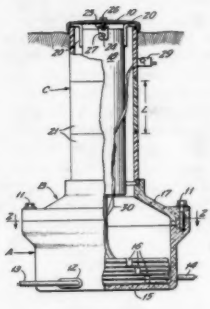


6. A connection assembly for connecting the glass face of a photodetector of any commercially available structure to continuous optical fiber protected substantially along its length by an insulation covering, except for a free end of said continuous optical fiber having a section without insulation covering, said insulation covering terminating abruptly at said section to form an annular shoulder of insulation comprising:
an optical fiber support member applied onto one end of said continuous optical fiber, said optical fiber support member having a first cylindrical zone with a diameter slightly greater than the insulated optical fiber;
a truncated connection zone, said annular shoulder of insulation abutting said optical fiber support member at said truncated cone; a second cylindrical zone having a diameter slightly larger than the optical fiber without said insulation covering; and a terminal flange with a central recess;
a support plate with first and second seats on opposite faces of said plate, said first seat cooperating with said terminal flange of said optical fiber support member and said second seat cooperating with said photodetector, said first and second seats having a cylindrical and coaxial shape and communicating with each other by a hole;
first means for fastening said optical fiber support member to said end of said optical fiber;
second means for fastening said flange of said optical fiber support member into said first plate seat; and
third means for fastening said photodetector into said second seat of the said plate.

4,709,980
BURIED-CABLE JUNCTION ENCLOSURE WITH CABLE-STORAGE VAULT

Gene P. Coli, Cranford, and Ignazio Leonardo, Mountainside, both of N.J., assignors to Coastal Engineered Products Company, Inc., Varnville, S.C.

Filed Aug. 2, 1985, Ser. No. 761,792
Int. Cl.[4] G02B 6/24
U.S. Cl. 350—96.20 **15 Claims**



1. A buried-cable vault enclosure for receiving end lengths of two multiple-line cables to be spliced and for also receiving a splice case interconnecting the respective corresponding lines of the two cables, said enclosure comprising a relatively large-diameter upwardly open cup-shaped base member having a closed bottom wall and an upstanding cylindrical wall with first and second diametrically opposed cable-entry ports providing cable access substantially at the level of the upper surface of the closed bottom wall, an open-ended intermediate member having a circular lower end conforming and secured to the upper end of the cylindrical wall of said base member, said intermediate member being characterized by a frustoconical wall which converges to a reduced-diameter upper circular end, an upstanding open-ended cylindrical upper wall member conforming to said reduced diameter and fitted at its lower end to the upper end of said intermediate member, said upper wall member being sufficiently elongate and adapted to removably support a portable splice case therewithin, with at least the inner volume of said base member totally available for recep-

tion of coiled lengths of both cables associated with the spliced ends of the cables.

4,709,981

CONNECTING STRUCTURE FOR CONNECTING OPTICAL CONDUCTORS

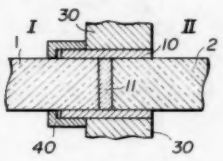
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Feb. 28, 1985, Ser. No. 706,548

Claims priority, application Japan, Mar. 5, 1984, 59-41848

Int. Cl.[4] G02B *6/38*

U.S. Cl. 350—96.21 **12 Claims**



10. A connecting structure for use on a space craft for connecting optical conductor means which pass through the external wall of a space craft and which transmit light rays into said space craft for illuminating said space craft, comprising a coupling ring air-tightly mounted within an opening in the external wall of a space craft, a light-admitting intercepting plate of transparent material disposed at an intermediate position of the longitudinal length of said coupling ring such that said light-admitting intercepting plate completely shuts off the internal space of the space craft from the surrounding external space, an external cylindrical optical conductor means having an end portion disposed in one end of said coupling ring, an internal cylindrical optical conductor means having an end portion disposed in the other end of said coupling ring, said end portions of said external and internal cylindrical optical conductor means each having an outer diameter approximately equal to the inner diameter of said coupling ring, said end portions of said external and internal optical conductor means each having a longitudinal end surface opposed to one another and juxtaposed to said light-admitting intercepting plate, first matching oil or optical paste connecting said end surfaces with said light-admitting intercepting plate, second matching oil or optical paste connecting said end portions of said external and internal optical conductor means to said coupling ring, said first matching oil or optical paste having a refractive index equal to the refractive index of said external and internal optical conductor means, said second matching oil or optical paste having a refractive index less than the refractive index of said external and internal optical conductor means, said external cylindrical optical conductor means having a coupling portion extending from said end portion of said external cylindrical optical conductor means, said coupling ring having an external longitudinal end, said coupling portion being disposed externally of said longitudinal end of said coupling ring, said coupling portion having a frusto-conical configuration which increases in diameter as said longitudinal end of said coupling ring is approached such that said coupling portion diffuses and dilutes the light energy transmitted in said external cylindrical optical conductor means, a cover member disposed externally of said space craft about a portion of said coupling ring and a portion of said external optical conductor means, said cover member contacting said external optical conductor means and said coupling ring and thereby retaining in place said first and second matching oil or optical paste, said cover member being made of a material having a refractive index less than the refractive index of said external and internal optical conductor means, whereby light rays are transmitted from the outside to the inside of said space craft via said external optical conductor means, said coupling portion, said light-admitting intercepting plate, and said internal optical conductor means, and wherein said coupling portion diffuses and dilutes light rays of high energy density transmitted in said external cylindrical optical conductor means to a lower desired energy density to be utilized within the space craft.

4,709,982

GELLED OIL FILLING COMPOUNDS

Robert W. Corne, and John M. R. Hagger, both of London, England, assignors to BICC Public Limited Company, United Kingdom

Filed Nov. 13, 1985, Ser. No. 797,618

Claims priority, application United Kingdom, Nov. 27, 1984, 8429878

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **8 Claims**

1. A gelled oil filling compound comprising a hydrocarbon oil with an aromatic content not greater than 12% and, as the only substantial polymeric constituent, a block copolymer having at least one molecular segment that tends to confer solubility in the oil and at least one molecular segment that tends to inhibit solubility in the oil, the proportion of the segments being such that the block copolymer forms a gel with the oil, wherein the weight average molecular weight of the block copolymer is in the range 200,000 to 2,000,000 and the quantity of block copolymer being so chosen from the range 1–10% that the compound resists drainage at temperatures up to 70° C. but has a viscosity at 120° C. not greater than 1000 cp.

8. A cable filled with the filling compound claimed in claim **1**.

4,709,983

OPTICAL CABLES

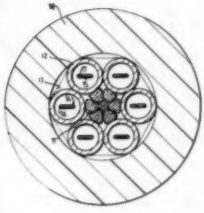
Karl W. Plessner, Kings Langley, and Michael J. Poole, London, both of England, assignors to BICC public limited company, London, England

Filed Sep. 19, 1985, Ser. No. 777,620

Claims priority, application United Kingdom, Sep. 21, 1984, 8423985

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **12 Claims**



1. A non-metallic flexible elongate strengthening member comprising a plurality of non-metallic flexible elements helically laid around a central non-metallic flexible element, each of which flexible elements comprises a multiplicity of filaments of non-metallic reinforcing material bonded together by a heat-softenable organic material and is coated with a release agent, the flexible elements of the assembly being so deformed and compacted together that any tendency for the flexible elements to spring apart is substantially eliminated.

4,709,984

RIBBON-SHAPED TRANSMISSION ELEMENT AND METHOD OF MANUFACTURE

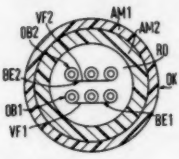
Ulrich Oestreich, Munich, and Ernst Mayr, Starnberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 22, 1985, Ser. No. 757,442

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1984, 3428567

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.23 **18 Claims**



1. A ribbon-shaped transmission element comprising a plurality of optical fibers, each of the optical fibers being provided with a separate coating to form an optical waveguide element, and a connecting layer, said waveguide elements being disposed in a side-by-side relationship and at a distance from one another on the layer with the layer proceeding roughly tangentially to outside surfaces of the coatings and the optical waveguide elements, and the coatings of the fibers consisting of the same material as the material of the layer.

4,709,985

FLEXIBLE OPTICAL FIBERS FOR USE IN VIEWING DEVICES

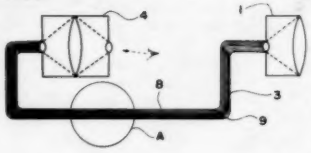
Toshio Takeuchi, Tokyo, Japan, assignor to Toyo Menka Kaisha, Ltd., Tokyo, Japan

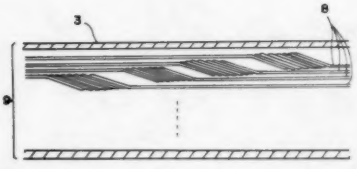
Filed Sep. 4, 1984, Ser. No. 646,521

Claims priority, application Japan, Sep. 27, 1983, 58-176983

Int. Cl.[4] G02B *6/06*

U.S. Cl. 350—96.25 **11 Claims**





1. A twisted flexible optical fiber bundle for use in viewing devices comprising a plurality of flexible optical fibers disposed in parallel with one another to define flexible optical fiber gatherings, each of said flexible optical fiber gatherings being twisted by 180° to define twisted flexible optical fiber gatherings so that a right side-left side inverted image is formed of an object viewed through a viewing device, said twisted optical fiber gatherings being longitudinally laminated together to define the twisted flexible optical fiber bundle.

4,709,986

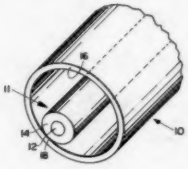
ENSHEATHED OPTICAL FIBER AND COUPLING METHOD

John W. Hicks, Jr., Northboro, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jun. 18, 1984, Ser. No. 621,933

Int. Cl.[4] G02B *6/16, 6/26*

U.S. Cl. 350—96.33 **8 Claims**



1. A single mode optical fiber comprising a single mode inner fiber nested within an auxiliary cladding tube, said inner fiber comprising a core of given diameter fabricated from optical transmission material having an index of refraction n_1, and a cladding layer of optical transmission material having an index of refraction n_2, where n_2 is less than n_1, said cladding layer having a wall thickness ranging between one to two core diameters for enhancing lateral coupling to an inner fiber of similar construction, said auxiliary cladding tube being fabricated from material having an index of refraction not substantially greater than that of said cladding layer and of large inner diameter as compared to the outer diameter of said inner fiber such that said inner fiber is at least partially spaced from the inner diameter of said auxiliary cladding tube, and said inner fiber being in supporting engagement with and connected to the inside surface of said auxiliary cladding tube along a lineal connection zone.

4,709,987

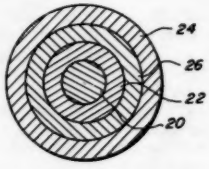
PRESSURE AND TEMPERATURE INSENSITIVE GLASS AND OPTICAL COATINGS AND FIBERS THEREFROM

Douglas Blackburn, Damascus; Albert Feldman, Rockville, and Nicholas Lagakos, Silver Spring, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 10, 1985, Ser. No. 807,150

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.34 **23 Claims**



1. A glass composition suitable for use as a temperature and pressure insensitive protective layer for optical fibers, comprising:

up to about 30 weight percent CaO;

between about 15–25 weight percent Al_2O_3;

between about 5–15 weight percent MgO;

up to about 15 weight percent TiO_2;

up to about 10 weight percent ZrO_2;

between about 20–35 weight percent SiO_2;

up to about 10 weight percent B_2O_3;

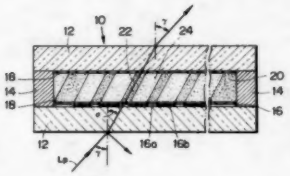
between about 5–45 weight percent Ta_2O_5; and up to about 40 weight percent Nb_2O_5.

4,709,988

DIRECTIONAL LIGHT-SHIELD BOARD

Yasuaki Kai; Takatoshi Sagawa, and Hiroshi Tabata, all of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 4, 1985, Ser. No. 794,844
Claims priority, application Japan, Nov. 17, 1984, 59-241622
Int. Cl.[4] G02B *5/00*
U.S. Cl. 350—276 R **11 Claims**



1. A directional light-shield board for placement in front of a visual display device, the light-shield board comprising:

a transparent substrate; and

an opaque film which is bonded to a major surface of said substrate and is formed with a number of substantially uniformly distributed light-transmitting apertures such that said opaque film comprises a number of wall-like parts respectively partitioning said apertures,

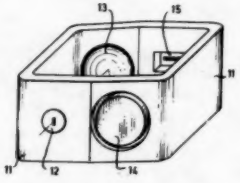
said apertures having a substantially rectangular shape and arranged in a checkered pattern, said apertures being bored obliquely such that at least a first pair of parallel wall-like parts of said opaque film are substantially unidirectionally inclined from a plane normal to said surface of said substrate and such that an apparent area of each of said apertures become maximum when the light-shield board is viewed from the direction of the inclination of said wall-like parts of said film.

4,709,989

CHASSIS FOR OPTICAL INSTRUMENTS

Meinrad Mächler, Ellwangen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Heidenheim on the Brenz, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 478,891, Mar. 25, 1983, abandoned. This application Sep. 25, 1985, Ser. No. 779,878
Claims priority, application Fed. Rep. of Germany, Mar. 31, 1982, 3211868
Int. Cl.[4] G02B *27/00*
U.S. Cl. 350—321 **11 Claims**



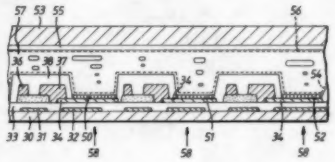
9. An optical instrument comprising a first optical element made of optical glass, a second optical element also made of optical glass and psotioned to receive light from said first element, and a chassis for holding said first and second elements in rigid fixed position relative to each other, said chassis being formed of compacted ceramic material compacted to a density of not less than about 2.8 grams per cubic centimeter and having a coefficient of thermal expansion approximately equal to the coefficients of thermal expansion of the glasses from which both of said optical elements are made.

4,709,990

METHOD OF MANUFACTURING A COLOR-MATRIX-TYPE LIQUID CRYSTAL DISPLAY DEVICE

Yasuhisa Oana, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Tokyo, Japan

Filed Mar. 8, 1985, Ser. No. 709,666
Claims priority, application Japan, Mar. 8, 1984, 59-42930
Int. Cl.[4] G02F *1/133*
U.S. Cl. 350—339 F **19 Claims**



1. A method of forming a self-aligned filter on an active matrix substrate for a color-matrix-type liquid crystal display device, the active matrix substrate comprising a plurality of picture element units arranged on a substrate in a matrix of rows and columns, each picture element unit including a switching element and a display electrode, said method comprising the steps of:

immersing the active matrix substrate into an emulsion comprising coloring matter of a predetermined color;

applying a voltage to at least one selected display electrode, the voltage being of a value, and applied for a length of time, sufficient to form an electrodeposited filter layer of the predetermined color on the display electrode;

removing the active matrix substrate from the emulsion; and

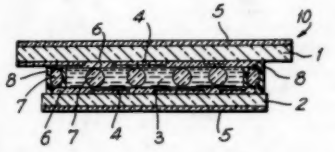
curing the electrodeposited filter layer.

4,709,991

LIQUID CRYSTAL DISPLAY WITH BARRIER LAYER TO REDUCE PERMEABILITY

Jun Hoshikawa, Nagano, Japan, assignor to Seiko Epson Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 603,865, Apr. 25, 1984, abandoned. This application Jun. 19, 1986, Ser. No. 875,519
Claims priority, application Japan, Apr. 26, 1983, 58-73329; Apr. 26, 1983, 58-73330; Apr. 26, 1983, 58-73331
Int. Cl.[4] G02F *1/13*; C09K *19/00*
U.S. Cl. 350—339 R **20 Claims**



1. A liquid crystal display panel, comprising two spaced apart transparent substrates, each substrate having transparent electrodes selectively formed on the interior opposed surfaces thereof, at least one of the transparent substrates being formed of a synthetic resin selected from the group consisting of polyester resin, cellulose resin, polyether sulfone resin, polysulfone resin, acrylic resin, polyethylene terephthalate resin, phenoxy

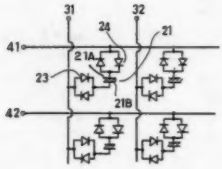
resin, urethane resin, phenoxy-urethane resin, polyether-ketone resin, polyether-ether-ketone resin, polyetherimide resin, epoxy resin, polyimide resin, polyamide resin, polyimideamide resin, polycarbonate resin, a mixture of the above resins, and a multilayer of the above resins and having a thickness between about 0.3 to 0.5 mm and a barrier coating layer disposed thereon for reducing permeability to at least one of air and water vapor and wherein said barrier coating layer is selected from the group consisting of polyvinyl alcohol, polyacrylonitrile, a mixture of polyvinyl alcohol and acrylic resin, a mixture of polyvinyl butyral and epoxy resin, polyvinylidene chloride, polyvinyl butyral, silicon dioxide and a material containing at least phosphoric acid and iron and having a thickness between about 5 to 50μ disposed thereon.

4,709,992

LIQUID CRYSTAL MATRIX DISPLAY DEVICE HAVING OPPOSED DIODE RINGS ON SUBSTRATES

Masakazu Ueno, Koyoso, Japan, assignor to Fuji Electric Co., Ltd., Japan

Filed Dec. 9, 1986, Ser. No. 939,616
Claims priority, application Japan, Dec. 10, 1985, 60-277459
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—339 R **2 Claims**



1. A liquid crystal matrix display comprising a pair of transparent substrates, between which is positioned a liquid crystal material for excitation, each substrate supporting an array of control elecrodes and a set of picture element electrodes, characterized in that on each substrate a diode ring comprising a parallel pair of oppositely-poled diodes is connected between each picture element electrode and its control electrode.

4,709,993

LIQUID CRYSTAL COLOR DISPLAY DEVICE HAVING PLURAL COLOR FILTERS PER SEGMENT ELECTRODE

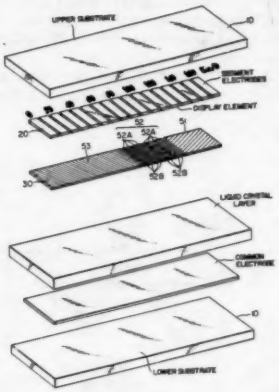
Shigeru Matsuyama; Mikio Kanazaki, both of Mobara; Norio Aoki, Chiba, and Akira Ishii, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Device Engineering Co., Ltd., Chiba, both of, Japan

Filed Dec. 17, 1986, Ser. No. 942,634
Claims priority, application Japan, Dec. 18, 1985, 60-282933
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—339 F **17 Claims**

1. A liquid crystal color display device comprising:

at least one first patterned electrodes and at least one second electrodes formed on a pair of opposed transparent substrates, respectively, for applying an electric field across a liquid crystal layer sandwiched between said first and second electrodes, each of said first electrodes defining, together with a one mating second electrode, a display element operable for display in a particular color; and

a filter layer formed for each of said first electrodes on one of said substrates, said filter layer being supported by said one substrate and placed in an optical path of light having entered the display device, in which the filter layer formed for at least one of said first electrodes includes at least two kinds of plural filtering segments, a first kind of filtering segments among said at least two kinds being made of a material having optical characteristics to pass therethrough light having wavelengths representative of a first color, and a second kind of filtering segments among said at least two kinds being made of a material having optical characteristics to pass therethrough light having wavelengths representative of a second color, said at least two kinds of plural filtering segments being arranged so



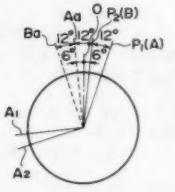
that the display element including said at least two kinds of plural filtering segments gives, when activated, a display in a color of a hue visually perceived different, as viewed at a distance, from those of said filtering segments.

4,709,994

LIQUID CRYSTAL DEVICE USING FERROELECTRIC LIQUID CRYSTAL TWISTED IN TWO STABLE STATES

Junichiro Kanbe, Yokohama, and Shinjiro Okada, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1985, Ser. No. 773,221
Claims priority, application Japan, Sep. 12, 1984, 59-190791
Int. Cl.[4] G02F 1/13
U.S. Cl. 350—350 S **38 Claims**



11. A liquid crystal device comprising a ferroelectric liquid crystal placed under bistability condition comprising two stable states, said ferroelectric liquid crystal being placed under the bistability condition in the presence of a surface which has been subjected to a uniaxial orientation treatment, the molecules of the ferroelectric liquid crystal aligning so as to be twisted in the direction of the liquid crystal layer thickness in either of the two stable states, the average electric dipole moments of the liquid crystal molecules in the two stable states being in mutually opposite polarities.

23. A switching device for electrooptically switching light rays from a light source, comprising:

a. switching means comprising a pair of oppositely spaced electrodes and a ferroelectric liquid crystal disposed between the opposite electrodes and placed under bistability condition comprising two stable states in the presence of a surface which has been subjected to a uniaxial orientation treatment, the molecules of the ferroelectric liquid crystal

aligning so as to be twisted in either of the two stable states,

b. means for applying a first voltage signal for orienting the liquid crystal molecules to one stable state and a second voltage signal for orienting the liquid crystal molecules to the other stable state, and

c. means for detecting an optical difference between a light ray having passed through ferroelectric liquid crystal molecules oriented to said one stable state and a light ray having passed through ferroelectric liquid crystal molecules oriented to said other stable state.

4,709,995

FERROELECTRIC DISPLAY PANEL AND DRIVING METHOD THEREFOR TO ACHIEVE GRAY SCALE

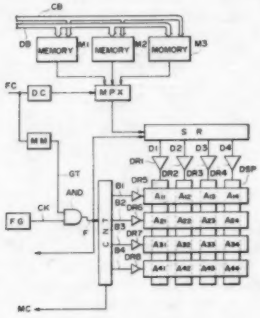
Masaki Kuribayashi, Higashikurume; Toshihiko Nakazawa, and Junichiro Kanbe, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

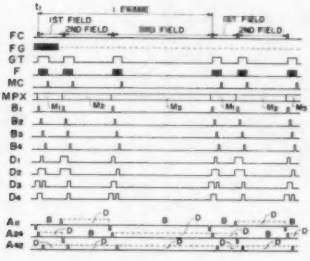
Filed Aug. 7, 1985, Ser. No. 763,432

Claims priority, application Japan, Aug. 18, 1984, 59-172231; Jul. 5, 1985, 60-148872; Jul. 5, 1985, 60-148873; Jul. 5, 1985, 60-148874

Int. Cl.⁴ G02F *1/13*

U.S. Cl. 350—350 S **68 Claims**





1. A display panel, comprising:

a liquid crystal device comprising a plurality of picture elements arranged in a plurality of rows and columns, each picture element comprising a ferroelectric crystal under bistability condition showing either a first or a second orientation state,

means for orienting the ferroelectric liquid crystal to either one of the first and second orientation states at respective picture elements, and

duration-controlling means for controlling the duration of the first or second orientation state at respective picture elements.

54. In a method for driving a display panel of the type comprising a plurality of picture elements arranged in a plurality of rows and columns, each picture element comprising a ferroelectric liquid crystal under bistability condition showing either a first or a second orientation state, either one of the first and second orientation states being written in respective picture elements to effect a display; the improvement comprising:

applying row by row a first signal for orienting the ferroelectric liquid crystal to the first orientation state at the whole or a part of the picture elements on a row ((N+1)th row) subsequent to a writing row (Nth row) to clear the picture elements and a second signal for orienting the ferroelectric liquid crystal to the second orientation state at a selected picture element among the cleared elements on the writing row (Nth row), and

controlling the duration of the first or second orientation state at respective picture elements.

4,709,996

FLUID LENS

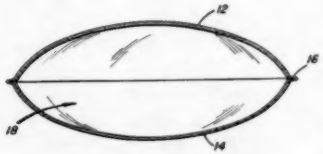
Paul E. Michelson, 2280 Calle Tiara, La Jolla, Calif. 92037

Continuation-in-part of Ser. No. 432,409, Sep. 30, 1982, Pat. No. 4,466,705. This application Aug. 10, 1984, Ser. No. 639,480

The portion of the term of this patent subsequent to Aug. 21, 2001, has been disclaimed.

Int. Cl.⁴ G02B *1/06*; G02C *7/04*; A61F *2/16*; A61K *9/22*

U.S. Cl. 350—418 **13 Claims**



1. A device for forming a fluid lens when immersed in a liquid medium, comprising:

a semipermeable transparent sheath defining a fully enclosed cavity and having a plurality of pores for permitting a liquid medium to flow into said cavity;

a hydrophilic polymer array disposed in said cavity and presenting a pressure differential across said sheath when said sheath is immersed in the liquid medium for causing liquid medium to flow into said cavity and to hydrate said array, causing said array to expand and to completely fill said cavity, thereby causing said sheath to expand and to assume a defined lenticular shape, wherein said hydrated array assumes a shape having an outer contour defined by said expanded sheath and constitutes a fluid lens.

4,709,997

ZOOM LENS

Hidenori Terasawa, Kawasaki, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Apr. 23, 1984, Ser. No. 602,962

Claims priority, application Japan, Apr. 27, 1983, 58-74539

Int. Cl.⁴ G02B *15/00*

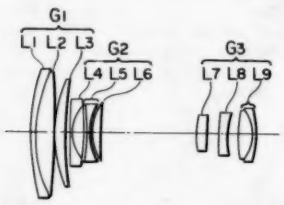
U.S. Cl. 350—427 **12 Claims**

1. A zoom lens in which fluctuation of lateral chromatic aberration is small during magnification change and which can maintain an excellent imaging performance over the entire magnification change range, said zoom lens having, in succession from the object side, a first group of positive refractive power including at least one positive lens, a second group of negative refractive power including at least one negative lens, and an aperture stop disposed closer to the image plane than said second group, each of said groups being moved on the optic axis during magnification change so that the distance between said first group and said second group becomes greater and the distance between said second group and said

aperture stop becomes smaller as the focal length of the entire system becomes longer, at least one of negative lenses constituting said second group being formed of a material which satisfies the following conditions:

$$\nu d+596.7\theta>386.5$$

$$\nu d>55,$$



where, when the refractive indices of the lens material for wavelengths 436 nm (g-line), 486 nm (F-line), 588 nm (d-line) and 656 nm (c-line) are ng, nF, nd and nc, respectively, νd and θ are defined as follows:

$$\nu d=(nd-1)/(nF-nc)$$

$$\theta=(ng-nF)/(nF-nc).$$

4,709,998

TELEPHOTO LENS SYSTEM

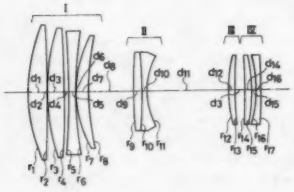
Takanori Yamanashi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1985, Ser. No. 741,222

Claims priority, application Japan, Jun. 8, 1984, 59-116574

Int. Cl.[4] G02B *9/00*

U.S. Cl. 350—454 **7 Claims**



1. A telephoto lens system comprising, in the order from the object side, a first lens unit having positive refractive power comprising at least one positive lens component and at least one negative lens component, a second lens unit having negative refractive power, a third lens unit having positive refractive power, and a fourth lens unit consisting of a positive lens component and a negative lens component, wherein said telephoto lens system is arraned to be focused by integrally moving said first lens unit through said third lens unit along the optical axis and is arranged to fulfill the conditions (1) through (7) shown below, said telephoto lens system being small in size and having high performance:

$$0.35<f_I/f<0.5 \quad (1)$$

$$0.9<\beta_{IV}<1.2 \quad (2)$$

$$1.21\leqq\theta_{Ip}23\ 1.29,\ 60\leqq\nu_{Ip}\leqq95.5 \quad (3)$$

$$25<\nu_{In}<40 \quad (4)$$

$$1.43<n_{Ip}<1.65 \quad (5)$$

$$1.6<n_{In}<1.9 \quad (6)$$

$$0.1<r_{IVa}/r_{IVb}<1.3 \quad (7)$$

where, reference symbol f represents the focal length of the lens system as a whole, reference symbol f_I represents the focal length of the first lens unit, reference symbol β_{IV} represents the lateral magnification of the fourth lens unit when said telephoto lens system is focused on an object at the infinite distance, reference symbol θ_{Ip} represents the partial dispersion ratio of said at least one positive lens component in the first lens unit, reference symbol ν_{Ip} represents Abbe's number of said positive lens component in the first lens unit for d-line, reference symbol ν_{In} represents Abbe's number of said negative lens component in the first lens unit for d-line, reference symbol n_{Ip} represents the refractive index of said positive lens component in the first lens unit for d-line, reference symbol n_{In} represents the refractive index of said negative lens component in the first lens unit for d-line, reference symbol r_{IVa} represents the radius of curvature of the surface on the negative lens component side of said positive lens component in the fourth lens unit, and reference symbol r_{IVb} represents the radius of curvature of the surface on the positive lens component side of each negative lens component in fourth lens unit.

4,709,999

LIGHT RADIATOR

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

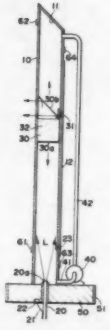
Filed May 15, 1985, Ser. No. 734,449

Claims priority, application Japan, Jun. 7, 1984, 59-117241

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.[4] G02B *5/08*; F21V *7/04, 33/00*

U.S. Cl. 350—486 **23 Claims**



1. A light radiator comprising a transparent cylinder, an optical conductor for guiding light rays into said cylinder through one end of said cylinder, an optical means which is movably accommodated inside of said cylinder for reflecting said light rays which have been guided into said cylinder from said optical conductor and then radiating said light rays outside said cylinder, and driving means for moving said optical means along the axis of said cylinder, said optical means being constructed with a cylindrical transparent member having an edge surface formed on a plane and another edge surface formed on an inclined plane.

4,710,000
SURGICAL STEREOMICROSCOPE

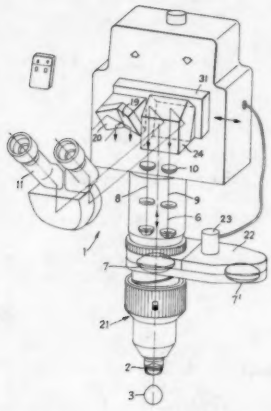
Manfred Spitznas, Bonn; Josef Reiner, Rodenkirchen; Wolfgang Veit, Solms, and Rainer Kirchhuebel, Asslar, all of Fed. Rep. of Germany, assignors to Oculus Optikgeraete GmbH, Wetzlar, Fed. Rep. of Germany

Filed Feb. 28, 1986, Ser. No. 834,943

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507458

Int. Cl.[4] G02B *21/22;* A61B *3/10*

U.S. Cl. 350—516 **5 Claims**



1. In a stereomicroscope for use in performing surgeries, in particular eye surgeries, comprising a collecting lens which is common to both beam paths and an objective lens for each beam path, an ocular tube for each beam path forming a telescope having two reversing prisms with adjustable interocular distance, the improvement comprising wherein between said objective lens and said ocular tubes which contain the telescopes there is inserted a double-refracting, reflecting system which delivers a turned, unreflected image and covers both beam paths, and wherein said reflecting system is arranged in such a manner in the stereomicroscope, that said reflecting system can be exchanged with a 90° prism which is constructed with the same optical path length and covers both beam paths.

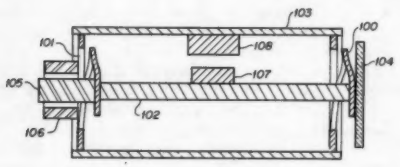
4,710,001
SUPPORT FOR A MOVING MIRROR IN AN INTERFEROMETER

Richard F. Lacey, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 21, 1986, Ser. No. 934,239

Int. Cl.[4] G02B *7/18*

U.S. Cl. 350—632 **7 Claims**



1. A supporting device for restricting movement to substantially one direction without tilting or wobbling, comprising:

a flat spring created by forming a plurality of openended slots in a flat sheet of spring stock, each slot partially enclosing the next innermost slot;

a frame for holding the edges of the flat spring in a fixed position; and

a moving means for imparting movement to the center of the flat spring in a direction substantially perpendicular to the plane of the flat spring.

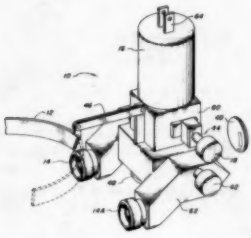
4,710,002
MAGNIFYING OPHTHALMOSCOPE

Oleg Pomerantzeff, Brookline, Mass., assignor to Eye Research Institute of Retina Foundation, Boston, Mass.

Continuation of Ser. No. 583,158, Feb. 24, 1984. This application May 27, 1986, Ser. No. 869,853

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—235 **10 Claims**



1. A stereoscopic ophthalmoscope for use with a condensing lens to observe the fundus of a patient's eye, the ophthalmoscope having a left eyepiece and a right eyepiece, a light source and a means for directing light from the light source into the patient's eye whereby a single image of the patient's eye is focused by the condensing lens in a focal plane perpendicular to an optical axis, said ophthalmoscope having the improvement comprising

A. an image-splitting means for splitting the single image, without interchange into a left image and a right image travelling along a left optical path and a right optical path, respectively,

B. left and right image-rotating means, each arranged in optical alignment with said image splitting means, for inverting and reversing each of the left and right images from the image-splitting means, and

C. left and right magnifying means, each comprising an objective lens and an ocular lens and each arranged in optical alignment with the respective image rotating means to magnify the image therefrom and to transmit that image to the respective eyepiece, whereby said eyepieces present to an observer a stereoscopic, magnified view of said fundus, inverted and with proper stereopsis.

4,710,003
CORNEA SHAPE MEASURING APPARATUS

Takashi Masuda, Kawasaki; Yukitugu Nakamura, Sagamihara, and Kyoji Sekiguchi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 543,041, Oct. 18, 1983, abandoned. This application Feb. 21, 1986, Ser. No. 833,660

Claims priority, application Japan, Oct. 21, 1982, 57-185290; Oct. 26, 1982, 57-188434

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—212 **12 Claims**

1. A cornea shape measuring apparatus comprising:

a continuous ring-shaped chart for measurement;

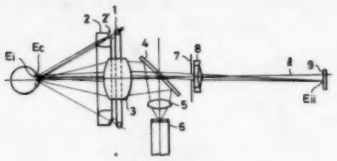
a continuous ring-shaped projecting means having a central axis and a continuous cylindrical surface, formed around the central axis, having a refractive power in each meridian direction but lacking a refractive power in a direction perpendicular thereto for projecting without distortion said chart onto the cornea of an eye to be examined by

converting rays emitted from said chart into parallel rays along a direction inclined relative to the central axis in a plane containing the central axis;

measuring means for measuring the corneal reflection image of said chart;

a measuring optical system for projecting the corneal reflection image of said chart onto said measuring means;

observation means for observing the corneal reflection image of said chart; and



an observation optical system for projecting the corneal reflection image of said chart onto said observation means, the magnification of said observation optical system being less than the magnification of said measuring optical system, such that the area of said eye observable by said observation means is larger than the image area of the corneal reflection image of said chart measured by said measuring means.

4,710,004

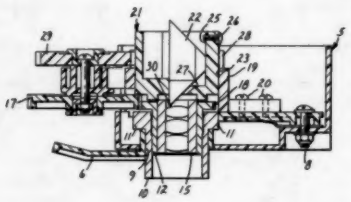
IMAGE ROTATION SYSTEM

Ronald J. Verhaagen, Vadnais Heights, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 25, 1987, Ser. No. 18,425

Int. Cl.[4] G03B *23/12*

U.S. Cl. 353—81 **2 Claims**



1. In a photographic apparatus for projecting images, a projection lens barrel assembly, said lens barrel assembly being disposed in an axially adjustable collar for focussing, and a dove prism being mounted in axial alignment with said projection lens barrel assembly in a rotatable prism holder, wherein said dove prism is slidable in said prism holder to maintain contact with said projection lens barrel assembly during axial movement thereof.

4,710,005

CAMERA FLASH MOUNT

Robert E. Bennett, 31411 Donnelly, Garden City, Mich. 48135

Filed Mar. 3, 1986, Ser. No. 835,729

Int. Cl.[4] G03B *15/05*

U.S. Cl. 354—126 **7 Claims**

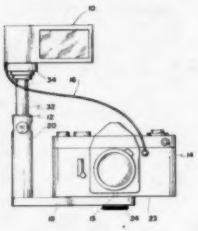
1. A strobe light support for a camera, comprising:

a first member;

a second member;

the first member having a tubular end with a first end opening and a sidewall having a slot defined therein, the slot having sides spaced a first distance and being relatively movable, the slot having one end merging into the first end opening and the opposite end of the slot being enlarged to define a second opening having a diameter greater than said first distance;

the second member being received in the end opening of the first member in a first position, and being pivotally movable from said end opening through the slot to said second opening to a second position;



pivot means connecting the first member to the second member;

means for supporting a strobe light on one of said members; and means for attaching the other member to the camera;

whereby the strobe light mounted on said one member is movable from said first position to said second position with respect to the camera.

4,710,006

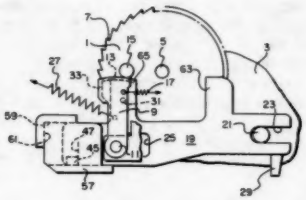
SHUTTER RELEASE AND FILM ADVANCE INTERLOCK MECHANISM

Wai C. Wong, Quarry Bay, Hong Kong, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 7, 1987, Ser. No. 46,767

Int. Cl.[4] G03B *17/42*

U.S. Cl. 354—204 **5 Claims**



1. An improved camera of the type wherein a shutter is opened to take a picture and film advance means is manually operable, and wherein the improvement comprises:

locking means movable between a locking position for preventing manual operation of said film advance means and a non-locking position for permitting manual operation of the film advance means;

actuating means movable from a cocked position a first increment of travel for opening said shutter and a second increment of travel for moving said locking means to its non-locking position; and

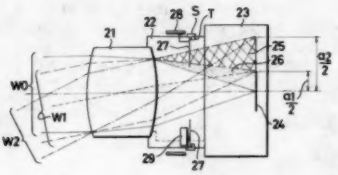
manually operable trigger means movable from an original position in which said trigger means engages said actuating means in its cocked position to a taking position for first disengaging said actuating means in its cocked position to permit the actuating means to move its first increment of travel and for then re-engaging said actuating means when the actuating means completes its first increment of travel, and movable back to its original position for again disengaging said actuating means to permit the actuating means to move its second increment of travel, whereby said film advance means is prevented from being manually operated when said shutter is opened.

4,710,007

CAMERA SYSTEM WITH LENS COUPLING MEMBER

Kazuo Tanaka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 22, 1985, Ser. No. 757,612
Claims priority, application Japan, Jul. 23, 1984, 59-152523
Int. Cl.[4] G03B 17/00
U.S. Cl. 354—286 8 Claims



6. A tube for connecting a camera body having a small format image plane to a photographic lens apparatus which images on said image plane, comprising:

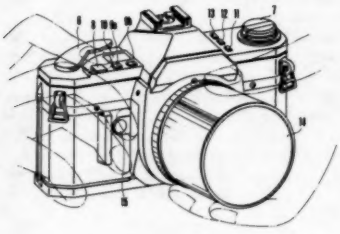
an aperture stop for shielding off-axial rays directed toward the margin of said image plane without shielding on-axial rays of said photographic lens apparatus.

4,710,008

CAMERA WITH OPERATION SWITCH

Yoichi Tosaka, and Masami Shimizu, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha

Continuation of Ser. No. 681,021, Dec. 13, 1984, abandoned.
This application Dec. 10, 1986, Ser. No. 940,175
Claims priority, application Japan, Dec. 15, 1983, 58-192130[U]; Dec. 15, 1983, 58-192131[U]; Dec. 27, 1983, 58-199064[U]; Dec. 27, 1983, 58-199065[U]
Int. Cl.[4] G03B 17/02, 7/00
U.S. Cl. 354—289.1 31 Claims



1. A camera comprising:

(a) a protruding part formed on the upper surface of the camera having a view finder optical system formed in the protruding part; and

(b) operation means for permitting change of a photographic information, said operation means including:

(b-1) a first operation switch arranged on one side of said protruding part;

(b-2) a second operation switch arranged on the other side of said protruding part;

(b-3) selecting means for selecting a particular one from a plurality of changeable photographic informations in a changeable condition in response to a switching operation of said first operation switch; and

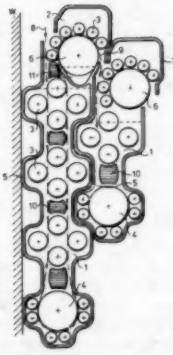
(b-4) changing means for changing the value of said plurality of photographic informations in response to a switching operation of said second operation switch, said changing means changing the value of said one particular photographic information selected by said switching operation of said first operation switch in response to said switching operation of said second operation switch.

4,710,009

PHOTOTECHNICAL APPARATUS OF VERTICAL ARRANGEMENT FOR CONTINUOUS DEVELOPMENT OF PHOTOGRAPHIC MATERIALS, PARTICULARLY PHOTOGRAPHIC PLATES

László Schneider, Néphadsereg u. 13, Budapest, V., Hungary

PCT No. PCT/HU84/00064, § 371 Date Aug. 22, 1985, § 102(e) Date Aug. 22, 1985, PCT Pub. No. WO85/02919, PCT Pub. Date Jul. 4, 1985
PCT Filed Dec. 20, 1984, Ser. No. 774,591
Claims priority, application Hungary, Dec. 23, 1983, 4444/83
Int. Cl.[4] G03D 3/02, 3/08
U.S. Cl. 354—322 14 Claims



1. In a phototechnical apparatus for continuous development of photographic materials, comprising first and second development units arranged in series between an input and an output and a forwarding unit arranged between said first and second development units for forwarding photographic materials from said first development unit to said second development unit, each of said development units including a plurality of passing rolls arranged in first, second and third columns parallel to a first axis and a reversing roll arranged at the end of said columns of passing rolls for reversing the direction of travel of the photographic materials, the third column of passing rolls of said first development unit being arranged adjacent to the first column of passing rolls of said second development unit, and the third column of said first development unit and the first column of said second development unit being separated by a wall, the improvement wherein said wall has an undulating cross section such that said wall intersects a plane tangent to adjacent passing rolls of said third column of said first development unit and a plane tangent to adjacent passing rolls of said first column of said second development unit.

4,710,010

LENS BARREL DRIVING DEVICE FOR CAMERA

Akihiro Namai, Kanagawa; Akira Egawa, and Takanori Kodaira, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha

Continuation of Ser. No. 713,473, Mar. 19, 1985, abandoned.
This application Feb. 9, 1987, Ser. No. 13,198
Claims priority, application Japan, Mar. 19, 1984, 59-51226; Mar. 19, 1984, 59-51228
Int. Cl.[4] G03B 3/10
U.S. Cl. 354—400 18 Claims

1. A barrel driving device for a camera comprising:

(a) a photographic lens barrel axially movable from an initial position;

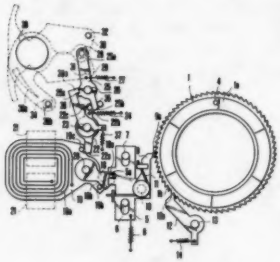
(b) moving means having a ratchet;

(c) a cam for moving said photographic lens barrel axially said cam operating with movement of said moving means to axially move said photographic lens barrel from the initial position, and, after completion of said movement, to return said photographic lens barrel to the initial position;

(d) an advancing member arranged upon engagement with said ratchet to move said moving means;

(e) an engaging member arranged upon engagement with said ratchet to hinder backward movement of said moving means;

(f) electromagnetic means for operating said advancing means;



(g) control means for controlling the supply of current to said electromagnetic means, said control means repeating periodic current passage to said electromagnetic means and determining the amount of movement of said photographic lens barrel from said initial position on the basis of the number of times of the repeated current passage;

(h) a switch for stopping the periodic current passage of said control means in respnse to return of said photographic lens barrel to the initial position; and

(i) counter means for counting the number of times of the periodic current passage of said counter means and disabling the switch until the value reaches a predetermined value.

4,710,011

AUTOMATIC RANGE FINDING DEVICE

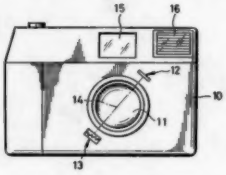
Seimei Ushiro, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 9, 1986, Ser. No. 917,190

Claims priority, application Japan, Oct. 9, 1985, 60-154467[U]

Int. Cl.[4] G03B *3/10*

U.S. Cl. 354—403 **7 Claims**



1. In an automatic range finding device comprising a light-emitting unit and a light-receiving unit disposed on the front face of a camera body, said units being spaced apart at opposite ends of an imaginary base line of predetermined lengths, means for emitting a slit of light in the form of a beam having a prdetermined width toward a subject to be photographed, the light from said beam reflected from said subject being received by said light-receiving unit to measure the subject distance based on the incident position of the received reflected light; the improvement in which: said light-emitting unit and said light-receiving unit are so disposed that said beam is disposed slantwise relative to an image plane of the camera, whereby the subject distance can be correctly measured irrespective of whether the camera is used in a horizontal position or in a vertical position.

4,710,012

FLASH PHOTOGRAPHY SYSTEM

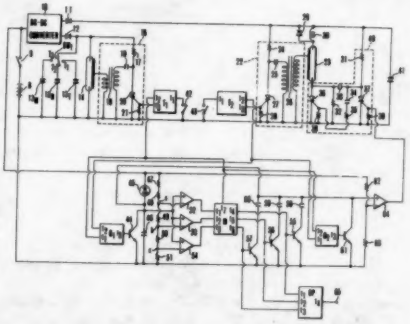
Masanori Yamada, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 12, 1986, Ser. No. 828,960

Claims priority, application Japan, Feb. 14, 1985, 60-027193

Int. Cl.[4] G03B *15/05*

U.S. Cl. 354—415 **19 Claims**



1. A flash exposure device having main light issuing means for producing flash light with which an object to be photographed is illuminated, and preliminary light issuing means of constant illumination coverage angle for producing flash light prior to the issuing of the main light to obtain information to be used when an exposure is made by illumination with the main light, comprising:

(a) illumination coverage angle varying means for varying the angle of illumination coverage of the flash light of said main light issuing means; and

(b) object light adjusting means for adjusting the object light amount illuminated by said preliminary light issuing means of constant illumination coverage angle in accordance with the preset angle of illumination coverage by said illumination coverage angle varying means.

4,710,013

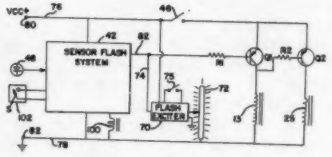
AUTOMATIC FOCUSING MECHANISM FOR CAMERA

Wai C. Wong, North Point, Hong Kong, assignor to W. Haking Enterprises Limited, North Point, Hong Kong

Continuation-in-part of Ser. No. 785,572, Oct. 8, 1985, abandoned, and Ser. No. 891,360, Jul. 29, 1986, abandoned. This application Aug. 27, 1986, Ser. No. 900,718

Int. Cl.[4] G03B *3/00, 7/16, 15/03, 7/085*

U.S. Cl. 354—419 **10 Claims**



1. In an improved camera having an aperture stop adjustable

between a fully open and at least one reduced aperture setting, a variable focus lens, a flash system for scene illumination, a photosensor-responsive control system including aperture control means for varying the aperture stop setting and focus control means for varying the lens focus-setting and for operating said flash system between operative and inoperative states, a shutter, a shutter cocking system, and a shutter actuating system for actuating the said shutter responsively to movement of a user-operated release member, the improvement comprising:

said lens being adjustable alternatively between a far-focus position for distant objects and a near-focus position providing a shorter object focusing distance, said control system responding to ambient illumination below a given value to actuate said flash system to an operative state, said aperture stop to said fully open setting, and said lens to said near-focus position, said control system responding to ambient illumination above said given value to actuate said flash system to an inoperative state, said aperture stop to a first reduced aperture setting no greater than the hyperfocal aperture value corresponding to said far-focus position of said lens, and said lens to said far-focus position.

4,710,014

CONTROL CIRCUIT FOR A PROGRAMMING SHUTTER

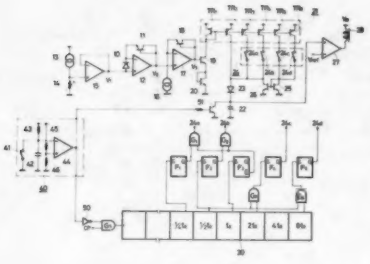
Takanori Kohno, Tokyo, Japan, assignor to Copal Company Limited, Tokyo, Japan

Filed Dec. 9, 1986, Ser. No. 943,941

Claims priority, application Japan, Dec. 14, 1985, 60-281689

Int. Cl.⁴ G03B *7/08*

U.S. Cl. 354—427 **6 Claims**



1. A control circuit for a programming shutter including first logarithmic compression means for logarithmically compressing a current flowing through a light receiving element in accordance with brightness of a subject to be photographed, logarithmic expansion means for logarithmically expanding an output voltage of the first logarithmic compression means, an integrating condenser charged by a current determined corresponding to an output current of the logarithmic expansion means in interlocked relationship with opening operation of shutter blades having function of diaphragm and a comparison circuit for producing a signal closing the shutter blades when a charging level of the integrating condenser reaches a predetermined reference level, comprising:

a plurality of weighted current sources each producing a current controlled by the output current of the logarithmic expansion means;

a plurality of current switches corresponding to each of said current sources for adding or subtracting current flowing through each of said current sources to or from the charged current to said integrating condenser; and

a counter which starts counting operation in interlocked relationship with the opening operation of the shutter blades to control operation pattern of said plurality of current switches by count of said counter.

4,710,015

DEVELOPING APPARATUS

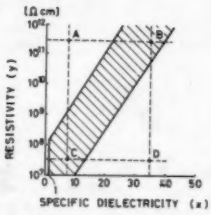
Fuchio Takeda, Tokyo; Hiroyuki Matsushiro, Yokohama; Kazuo Kobayashi, Kawasaki, and Toshio Kaneko, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 28, 1986, Ser. No. 923,904

Claims priority, application Japan, Oct. 28, 1985, 60-239598; Oct. 28, 1985, 60-239599

Int. Cl.⁴ G03G *15/08*

U.S. Cl. 355—3 DD **2 Claims**



1. A developing apparatus of the type in which a thin toner layer is formed on a toner carrier such that said toner carrier is in contact with a latent image carrier through said toner layer to devlope a latent image on said latent image carrier, characterized by that said toner carrier is composed of an electrically conductive substrate an elastic dielectric layer formed on said substrate and supported thereby and an insulating layer formed on said elastic dielectric layer and that said elastic dielectric layer is formed of a material which satisfies

$$\log_{10} y < 0.15x + 7.5 \ (x > 1)$$

where x is specific dielectricity of said material and y is resistivity of said material.

4,710,016

DEVELOPING APPARATUS

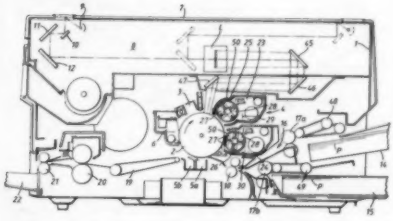
Junji Waatanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 3, 1986, Ser. No. 835,249

Claims priority, application Japan, Mar. 26, 1985, 60-61477; Jul. 15, 1985, 60-155508

Int. Cl.⁴ G03G *15/08, 15/01*

U.S. Cl. 355—4 **10 Claims**



1. A copying machine comprising:

(a) an image carrier having a surface on which a latent image can be formed;

(b) a first developing unit arranged close to said image carrier for developing a latent image formed on the surface of said image carrier with a first developer;

(c) a second developing unit arranged close to said image carrier for developing a latent image formed on the surface of said image carrier with a second developer;

(d) a first moving means for moving said first developing

unit between a first position in which said first developing unit is operably associated with said image carrier and a second position in which said first developing unit is disassociated from said image carrier, said first moving means comprising a first spring member one end of which is connected to said first developing unit;

(e) a second moving means for moving said second developing unit between a first position in which said second developing unit is operably associated with said image carrier and a second position in which said second developing unit is disassociated from said image carrier, said second moving means comprising a second spring member one end of which is connected to said second developing unit; and

(f) an actuating means connected to said first and second means for selectively actuating said first and second moving means so that said first or second developing unit is operably associated with said image carrier while said second or first developing unit is disassociated from said image carrier, said actuating means comprising:

(i) an arm member pivotable about a fulcrum positioned at the middle portion of said arm member, one end of said arm member being connected to the other end of said first spring member while the other end of said arm member is connected to the other end of said second spring member, and

(ii) a reversible motor connected to said arm member so as to reversibly pivot said arm member.

4,710,017

OPTICAL UNIT HOLDING DEVICE FOR COPYING MACHINES

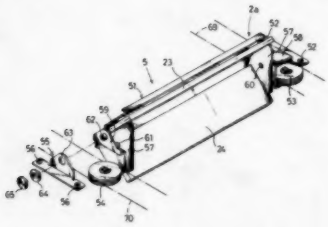
Toshio Watanabe, Takatsuki; Eiji Tsutsui, Amagasaki, and Arihiro Tsunoda, Higashiosaka, all of Japan, assignors to Mita Industrial Co., Ltd., Japan

Filed Jun. 26, 1986, Ser. No. 879,732

Claims priority, application Japan, Jun. 27, 1985, 60-142293; Sep. 30, 1985, 60-218790; Sep. 30, 1985, 60-218792; Sep. 30, 1985, 60-218793

Int. Cl.[4] G03G *15/00, 15/28;* G03B *27/34*

U.S. Cl. 355—8 **7 Claims**



1. An optical unit holding device for copying machines comprising a support frame having a support frame proper to hold an optical system reciprocating for exposure of the documents placed on a contact glass, pairs of slide members attached respectively to the bottom of both ends of said support frame, and an end member attached to one of said pairs of slide members; wherein said end member is connected to said support frame proper in a manner that said end member turns within the plane including a slider which is holding said slide members, a driving wire to transmit driving power is attached respectively to said end member and said support frame proper, and said pairs of slide members are respectively held on a corresponding slider.

4,710,018

VARIABLE MAGNIFICATION COPYING APPARATUS

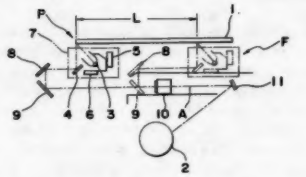
Takashi Miyaji, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 18, 1986, Ser. No. 886,612

Claims priority, application Japan, Jul. 19, 1985, 60-160959

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—8 **3 Claims**



1. A variable magnification copying apparatus arranged to determine a scanning amount having a leading edge of an original document as a reference point, based on a copy paper size and a copying magnification as selected so as to control positions of a zoom lens assembly from the copying magnification, the improvement comprising an original document trailing edge indicating plate provided on a copy lamp unit for scanning the original document, and means for displacing said original document trailing edge indicating plate together with the copy lamp unit based on the value calculated from said copy paper size and copying magnification, thereby to set a terminal point of said displacement as a home position of said copy lamp unit.

4,710,019

PHOTOGRAPHIC PRINTER AND METHOD FOR DETERMINING EXPOSURE AMOUNT THEREOF

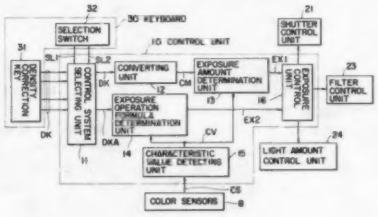
Takaaki Terashita, Ashigara-Kamigun, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation-in-part of Ser. No. 743,966, Jun. 12, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 944,055

Claims priority, application Japan, Jun. 15, 1984, 59-123263

Int. Cl.[4] G03B *27/73*

U.S. Cl. 355—38 **19 Claims**



1. A method for determining a printing exposure amount in a photographic printer comprising the steps of:

obtaining a plurality of characteristic values of a negative film to be printed, which represent features of a picture image, by scanning said negative film;

calculating an exposure amount necessary for printing said negative film due to the obtained characteristic values;

inputting classification information for correcting the calculated exposure amount on the basis of a visual discrimination of said negative film;

selecting one of a plurality of previously prepared exposure operation formulas according to said inputted classification information; and

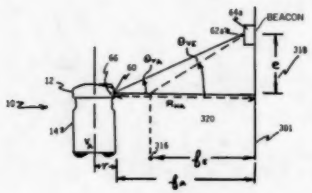
determining printing exposure amount in accordance with

said calculated exposure amount and said selected exposure operation formula using said characteristic values.

4,710,020
BEACON PROXIMITY DETECTION SYSTEM FOR A VEHICLE

James F. Maddox, Arlington; Mark B. Kadonoff, Somerville, both of Mass.; Alan D. Berger, Pittsburgh, Pa.; Amy L. Taivalkoski, Salem; Robert W. George, II, Windham, both of N.H., and Faycal E. Benayad-Cherif, Somerville, Mass., assignors to Denning Mobil Robotics, Inc., Woburn, Mass.

Filed May 16, 1986, Ser. No. 864,292
Int. Cl.[4] G01C *3/00*; B25J *5/00*
U.S. Cl. 356—1 **24 Claims**



1. A proximity detection system for determining the distance between a vehicle and a navigation beacon comprising:

detector means, responsive to the beacon, for resolving the altitude angle between the beacon and the vehicle;

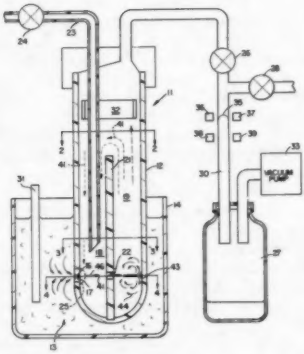
means, responsive to said resolved altitude angle and to the height of the beacon, for determining the distance between the beacon and the vehicle; and

means for defining an optimum distance between the beacon and the vehicle and for comparing said determined distance and said optimum distance to establish any difference between them.

4,710,021
PARTICULATE MATTER ANALYZING APPARATUS AND METHOD

Wieland E. von Behrens, Chicago, Ill., assignor to Sequoia-Turner Corporation, Mountain View, Calif.

Continuation of Ser. No. 542,224, Oct. 14, 1983, abandoned.
This application Mar. 5, 1986, Ser. No. 837,875
Int. Cl.[4] G01N *15/12, 15/14, 21/85*
U.S. Cl. 356—72 **13 Claims**

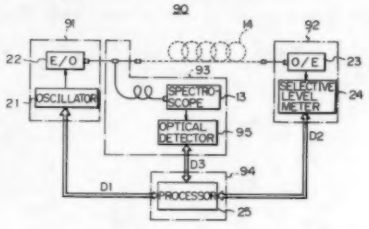


1. The method for the analytic counting of particulates suspended in a liquid medium including the steps of passing the particulate-carrying fluid through an aperture into a first region of a chamber containing particulate-free fluid, passing the stream of particulate-carrying fluid so produced through one or more sensors for analytically counting the particulates, passing the particulate-carrying stream through an opening in a barrier straddling the jet stream into a second region of the chamber, said barrier serving to preserve the volume of the first region in which the particle-carrying stream line is maintained, said barrier preventing direct recirculation of previously sensed particles through the opening straddling the jet stream into the first region while maintaining within said chamber, spaced from the opening between the first and second regions, free, direct and unhindered fluidic communication between the first and second regions and passing a volume of particulate-carrying and/or particulate-free fluid through a single output port so that the volume entering the chamber, the volume leaving the chamber, and the volume of particulate-carrying fluid passed through the sensors are all exactly equal, no portion of the particulate-carrying fluid being permitted to return to the regions of the sensors.

4,710,022
METHOD AND APPARATUS FOR MEASURING CHROMATIC DISPERSION COEFFICIENT

Kazuhiko Soeda, Yokohama; Masakazu Mori, Kawasaki; Tsutomu Nishikawa, Yokohama, and Kiyoshi Tomimori, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 25, 1984, Ser. No. 654,158
Claims priority, application Japan, Oct. 31, 1983, 58-202706
Int. Cl.[4] G01N *21/84*
U.S. Cl. 356—73.1 **19 Claims**



1. A method for measuring a chromatic dispersion coefficient comprising the steps of:

(a) measuring an actual baseband characteristic of an optical fiber in accordance with a received optical signal level at an output end of the optical fiber, wherein the received optical signal corresponds to an input optical signal, having components of respective amplitudes in its optical spectrum corresponding to a plurality of oscillation modes, that is provided to an input end of the optical fiber, the input optical signal being modulated in amplitude with an AC signal which is varied to provide a plurality of modulation frequencies;

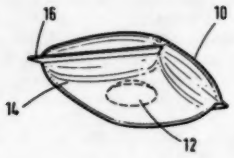
(b) obtaining a calculated baseband characteristic having a profile fitting closest to the actual baseband characteristic, by using data concerning the wavelengths and amplitudes of said components corresponding to said oscillation modes in the optical spectrum of the input optical signal, data concerning the modulation frequencies, and data concerning a provisional chromatic dispersion coefficient; and

(c) determining the provisional chromatic dispersion coefficient providing said closest fitting profile as the actual chromatic dispersion coefficient of the optical fiber.

4,710,023
MEASUREMENT OF CONTACT LENSES

Ronald Loveridge, Harrow, United Kingdom, assignor to Ruxley Holdings Ltd. and Kilfa Limited, both of, United Kingdom

Continuation of Ser. No. 620,063, Jun. 13, 1984, abandoned. This application Sep. 29, 1986, Ser. No. 913,598
Claims priority, application United Kingdom, Jun. 17, 1983, 8316567
Int. Cl.[4] A45C *11/04;* G01B *9/00*
U.S. Cl. 356—124 9 Claims

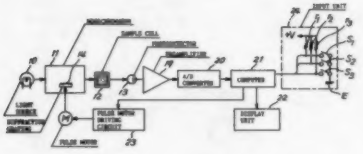


1. In a method for measurement of one or more optical parameters of a contact lens, the improvement comprising the step of taking the measurement while the lens is contained in an aqueous fluid in a sealed sachet of plastics film of composition optically compatible with the measurements to be taken.

4,710,024
SPECTROPHOTOMETER

Toshiaki Fukuma, Kyoto, Japan, assignor to Shimadzu Corporation, Japan

Filed Jul. 2, 1986, Ser. No. 881,331
Claims priority, application Japan, Jul. 2, 1985, 60-145377
Int. Cl.[4] G01J *3/42*
U.S. Cl. 356—328 5 Claims

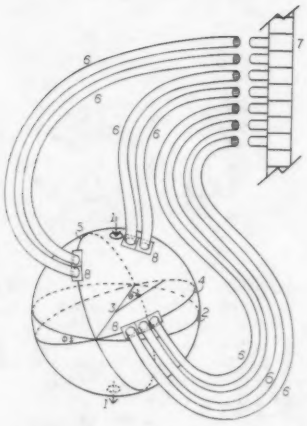


1. A spectrophotometer comprising:
a light source;
a monochromator including a diffraction grating and a motor for driving said diffraction grating to provide a beam of monochromatic light at the exit slit of said monochromator;
a sample cell containing a sample to be analyzed and so disposed that said monochromatic light beam impinges on said sample cell;
a photodetector for detecting the light from said sample to produce a corresponding electrical signal;
a data processor for obtaining the wavelength of said monochromatic light from the amount of rotation of said motor in accordance with a predetermined functional relation;
an input unit for setting a parameter corresponding to the difference between the nominal and actual grating constants of said diffraction grating;
said data processor being so arranged as to obtain said wavelength in accordance with said nominal grating constant having been modified with said parameter set in said input unit; and
a display unit for displaying said wavelength.

4,710,025
PROCESS FOR CHARACTERIZING SUSPENSIONS OF SMALL PARTICLES

Philip J. Wyatt, Santa Barbara, and Gregory M. Quist, Goleta, both of Calif., assignors to Wyatt Technology Company, Santa Barbara, Calif.

Continuation of Ser. No. 390,980, Jun. 22, 1982, Pat. No. 4,548,500. This application Sep. 9, 1985, Ser. No. 773,652
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[4] G01N *21/53*
U.S. Cl. 356—343 17 Claims

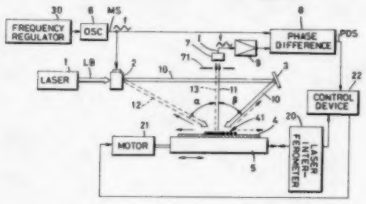


1. A Process to characterize a suspension of particles comprising the steps of:
A. Introducing said suspension into a region surrounded by a plurality of detectors, each at a different angular location;
B. Passing a narrow beam of electromagnetic radiation through said suspension;
C. Detecting the radiation scattered by said suspension at said different angular locations;
D. Converting each said detected scattered radiation into a proportional numerical value;
E. Storing said numerical values in a memory means corresponding to each discrete detector means;
F. Deriving measured optical observable values by combining sufficient selected sets of stored numerical values to yield a set of optical observables characteristic of the suspension of interest;
G. Defining an optical observable map for a fixed range of optical observable values in terms of a set of physical observables, each physical parameter restricted to a domain encompassing those characteristic of the suspension of interest, and said map consisting of closed regions within which ranges the circumscribing physical parameters would result in an optical observable within the defining fixed range;
H. Retrieving from memory means previously stored maps of optical observables, one map for each measured optical observable value and whose range of optical observable values bracket the corresponding computed values;
I. Superimposing a sufficient number of said retrieved maps of optical observables to yield a unique and finite region of overlap;
J. Identifying the range of each suspension's physical parameters corresponding to the common overlap region of said retrieved maps; and,
K. Classifying and identifying the unknown suspension by the value of the physical parameters defined by the optical observable map overlap region.

4,710,026
POSITION DETECTION APPARATUS

Nobutaka Magome, Kawasaki, and Yutaka Ichihara, Yokohama, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Mar. 18, 1986, Ser. No. 840,880
Claims priority, application Japan, Mar. 22, 1985, 60-57890; Sep. 5, 1985, 60-196783
Int. Cl.[4] G01B *9/02*
U.S. Cl. 356—349 **17 Claims**



1. An apparatus for detecting a position of an article on which a diffraction grating is provided, comprising:

means for emitting first and second coherent light beams radiated onto said diffraction grating, said first and second light beams having different frequencies, thereby generating an optical beat based on interference between diffracted light beams of said first and second light beams which are generated from said diffraction grating;

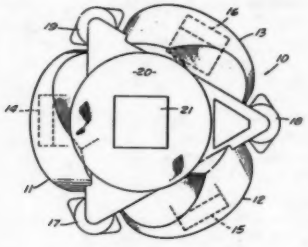
means for producing a reference signal having a frequency corresponding to a frequency difference between said first and second light beams; and

means, including means for detecting said optical beat, for comparing a phase of said optical beat with that of said reference signal.

4,710,027
METHOD AND APPARATUS FOR MECHANICAL DITHER STABILIZATION OF A LASER ANGULAR SENSOR

Samuel N. Fersht, and Rena S. Fersht, both of Studio City, Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Continuation-in-part of Ser. No. 634,324, Jul. 25, 1984, abandoned, which is a continuation-in-part of Ser. No. 574,845, Jan. 30, 1984, abandoned. This application May 16, 1986, Ser. No. 864,284
Int. Cl.[4] G01C *19/64*
U.S. Cl. 356—350 **35 Claims**



1. In combination:

at least three ring laser angle sensors, having non-coaxial sensing axes, for sensing angulat motions, each having an operative laser part and a mounting part with freedom of angular vibration between said parts, said mounting parts of said sensors being rigidly attached together to form an instrument block, further including at least three angular sensor dithering means, one on each of said sensors, respectively, for mechanically dithering said operative portion of each said sensor about its sensing axis, at a prescribed frequency, emplitude and phase, relative to said block;

a compensating weight, mounted upon said instrument block with freedom of angular vibration, relative to said block, about a dither axis that has components in the directions of each of said sensing axes;

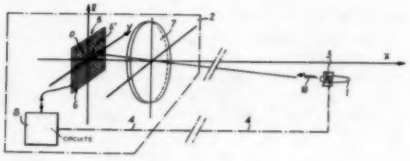
compensating weight dithering means for mechanically dithering said compensating weight about said dither axis at a prescribed frequency, amplitude, and phase to reduce rotational vibration of said block; and

said three ring laser angle sensors being substantially identical and mounted with mutually orthogonal sensing axes for sensing rotations about said sensing axes, and said compensating weight being mounted with said dither axis at prescribed angles relative to each of said sensing axes.

4,710,028
SYSTEM FOR LOCATING A BODY IN MOTION

Gilles Grenier, L'Hay-Les-Roses; Jérôme Maffert, Versailles; Jean-Pierre Merle, Orsay, and Jacques R. des Ordons, Savigny, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Jun. 2, 1986, Ser. No. 869,302
Claims priority, application France, Jun. 17, 1985, 85 09158
Int. Cl.[4] G01B *11/26*
U.S. Cl. 356—375 **8 Claims**



1. A tracking device for locating a flying body, such as a missile, within the line of sight of said tracking device, said tracking device comprising:

a fixed planar matrix of controllable photosensitive elements, the plane of which is at least substantially at right angles with said line of sight;

electronic means for controlling said photosensitive elements;

an optical system for forming an optical image of said flying body onto said fixed planar matrix;

an optical emitter producing flash signals being carried by said flying body and synchronization means being provided for said electronic control means to deliver control pulses triggering off the taking of images synchronized with said flash signals.

4,710,029
PROJECTION TYPE EXPOSING APPARATUS

Kinya Katoh, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Nov. 12, 1985, Ser. No. 796,785
Claims priority, application Japan, Nov. 19, 1984, 59-244229
Int. Cl.[4] G01B *11/00*
U.S. Cl. 356—401 **11 Claims**

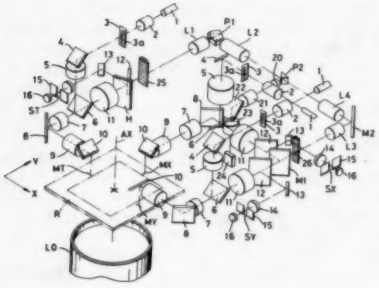
1. A projection type exposing apparatus including:

(a) a projection objective for projecting the image of a first object having a predetermined pattern and a plurality of alignment marks onto a second object;

(b) photoelectric alignment means for aligning said first object, said photoelectric alignment means having an imaging optical system for forming images of the alignment marks of said first object, a photoelectric detecting slit member disposed at a predetermined image position of

said imaging optical system, and slit image displacing optical means for optically displacing the image position of said slit member on said first object in a direction perpendicular to the lengthwise direction of said slit member, said slit member being designed such that the lengthwise direction of the image of said slit member on said first object is coincident with a radial direction from the optic axis of said projection objective;

(c) a movable stage for supporting said second object thereon for movement relative to said projection objective; and



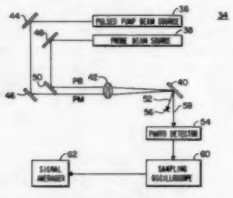
(d) a reference index mark member provided on said movable stage, said slit image displacing optical means displacing the image of said slit member so that the image of said slit member substantially corresponds to the image of said reference index mark member which said projection objective projects on said first object when said movable stage is disposed at a predetermined position, whereby rotational error of said photoelectric alignment means relative to said movable stage is eliminated.

4,710,030

OPTICAL GENERATOR AND DETECTOR OF STRESS PULSES

Jan Tauc; Humphrey J. Maris, both of Barrington, and Christian Thomsen, Providence, all of R.I., assignors to Bw Brown University Research Foundation, Providence, R.I.

Filed May 17, 1985, Ser. No. 735,825
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—432 **37 Claims**



1. An optical stress pulse generation and detection system for non-destructively measuring physical properties of a sample, comprising:

a radiation source for providing a pulsed pump beam having at least one short duration radiation pulse having a duration of 0.01 to 100 psec, and having an intensity and at least one wavelength selected to non-destructively generate a stress pulse in a sample;

a radiation source for providing a probe beam;

means for directing said pump beam to a surface of a sample to generate said stress pulse in said sample;

means for guiding said probe beam to a location at said sample to intercept said stress pulse; and

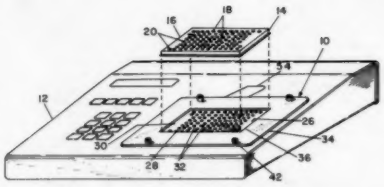
means for detecting a change in an optical parameter of said probe beam representative of the change in optical constants induced by said stress pulse in said sample.

4,710,031

MICROTITER PLATE READER

John E. Kelly, Duluth, Ga.; Don C. Jones, Madison, Wis.; Frederick R. Tuck, Norcross; William A. Zimmermann, Lilburn, both of Ga., and Kenneth R. Clark, Cottage Grove, Wis., assignors to Lancraft, Inc., Norcross, Ga.

Filed Jul. 31, 1985, Ser. No. 761,199
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—440 **13 Claims**



1. A microtiter plate reader for optically examining the contents of the wells of a microtiter plate having an array of wells, comprising:

(a) supporting means for supporting the microtiter plate with the wells opening generally upwardly;

(b) a light emitting surface extending under a microtiter plate when held by the supporting means to transmit light upwardly to the plate;

(c) an array of regions of reduced light emission on the light emitting surface corresponding in relative position to a selected portion of the array of microtiter plate wells when held by the supporting means, wherein the array of regions of reduced light emission is a selected number of black dots arranged as a black dot array, each black dot generally corresponding in location to a well; and

(d) locator means for locating the microtiter plate in selected relation to the black dot array of regions of reduced light emission such that the array of black dots can be selectively aligned or disaligned with the wells of the plate.

4,710,032

ARRANGEMENT FOR PREPARING A CHARGE OF COMPOSITIBLE MATERIAL FOR A COMPOSTING PLANT

Tore H. Nordlund, Torshälla, Sweden, assignor to Purac AB, Lund, Sweden

Filed Apr. 23, 1986, Ser. No. 854,835
Claims priority, application Sweden, Apr. 29, 1985, 8502087
Int. Cl.[4] B01F *15/02*
U.S. Cl. 366—156 **3 Claims**

1. An arrangement for preparing a charge for composting, which charge includes sewage sludge, a carbon-carrier and material that has already been composed, said arrangment comprising

(a) a first conveyor (1),

(b) a first supply means for supplying sewage sludge and a carbon-carrier to said first conveyor,

(c) a second supply means for supplying already composted material to said first conveyor,

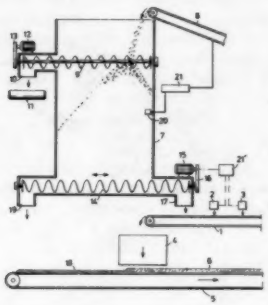
(d) a mixer for mixing together the materials received from said first and second supply means,

(e) a second conveyor (5) for receiving the material discharged from said mixer and delivering it to a composting plant,

(f) a residence tank (7) for receiving composed material from a composting plant,

(g) a third conveyor (8) for conveying composted material from said composting plant to said residence tank (7),

(h) a first feeding means in the upper part of said residence tank (7) that is adapted to feed composted material from a first level in said residence tank (7) to a first outlet for the final composted product, and



(i) a second feeding means (14) adjacent the lower part of said residence tank (7) for feeding composted material withdrawn from the residence tank (7) to said second supply means (c).

4,710,033

TEMPERATURE MEASUREMENT SYSTEM

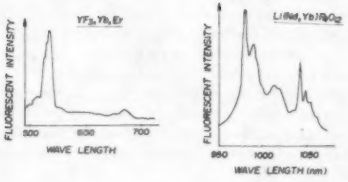
Masao Hirano, Takatsuki; Mitsutaka Kato; Hirohiko Yasuda, both of Kyoto, and Seisuke Hinoda, Uji, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 365,028, Apr. 2, 1982, abandoned. This application May 28, 1985, Ser. No. 738,512

Claims priority, application Japan, Apr. 7, 1981, 56-51997

Int. Cl.[4] G01K *11/12*

U.S. Cl. 374—161 **2 Claims**



1. A temperature measurement system comprising:

a phosphorescent material adapted for placement in an environment the temperature of which is to be measured, said material including one of the active rare earth substances chosen from the group consisting of Yb, Er, Tm, and Ho and one of the parent substances chosen from the group consisting of GdF_3, LaF_3, YF_3, LuF_3, CaF_2, BaF_2, $BaYF_5$, $NaLuF_4$ and Y_3OCl_7;

means for exciting said material to emit phosphorescent light, said exciting means comprising a light emitting diode for irradiating said material with infrared radiation to excite said material;

means for receiving emitted light and detecting the intensity thereof; and

means for integrating the value of intensity for a given time only following cessation of excitation to determine said temperature.

4,710,034

DOUBLE-CONICAL STATIC PRESSURE-TYPE GAS BEARING

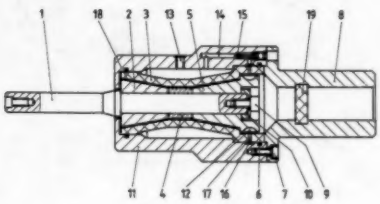
Gabriel Tittizer, Rösrath-Hoffnungstal; Ewald Junghans, Bergisch Gladbach; Georg Bestenreiner, Rösrath, and Christian Dahm, Cologne, all of Fed. Rep. of Germany, assignors to Interatom GmbH, Bergisch Gladbach, Fed. Rep. of Germany

Filed Jun. 6, 1986, Ser. No. 871,705

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1985, 3520717; Apr. 10, 1986, 3612097

Int. Cl.[4] F16C *32/06, 33/02*

U.S. Cl. 384—110 **10 Claims**



1. Static pressure-type gas bearing assembly for a high-speed rotary shaft, comprising a porous bearing bushing formed of a pair of hollow cone frustums connected to one another at respective narrow ends thereof, and a plurality of bearing members formed of plastic material and mountable on a shaft, said bearing members having a shape complementary to that of said bearing bushing and comprising two discrete frustoconical members having respective smaller diameter ends facing towards one another.

4,710,035

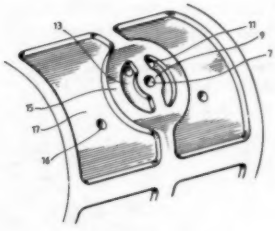
INHERENT VARIABLE FLUID RESTRICTOR

Mark R. Vaughn, Albuquerque, N. Mex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Jun. 16, 1986, Ser. No. 874,859

Int. Cl.[4] F16C *17/02*

U.S. Cl. 384—115 **8 Claims**



4. A hydrostatic bearing comprising:

a hollow body member defining a sleeve-like member;

a shaft member journalled in said sleeve-like member;

said members having opposed bearing surfaces;

a plurality of bearing pockets distributed around one of said surfaces in diametrically opposed pairs;

a separate inlet port in each said pocket adapted to supply fluid lubricant to said pocket;

a separate restrictor land around each said inlet port;

a separate isolation land around and spaced from each said restrictor land to define a collection gallery beween said lands, said isolation land also isolating said collection gallery from the remaining portion of its respective pocket; and

a separate outlet port in each said gallery configured to

convey fluid lubricant from its respective gallery to said remaining portion of the pocket diametrically opposite the bearing pocket of said outlet port.

4,710,036

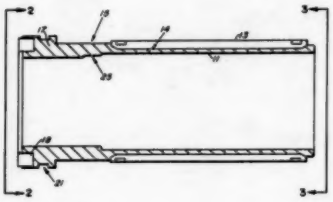
BEARING ASSEMBLY

Bela Geczy, Orange, Calif., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Mar. 20, 1986, Ser. No. 841,570

Int. Cl.[4] F16C *17/10*

U.S. Cl. 384—275 **3 Claims**



1. In a downhole earth boring motor, apparatus comprising:
a drive shaft;
a generally cylindrical unitary bearing sleeve having an elongated recessed area on its outer surface and an integrally formed thrust head at one end thereof;
a radial bearing comprising tungsten carbide chips in a copper base infiltrant bonded to said sleeve in said elongated recesssed area;
a plurality of radially disposed cylindrical openings in said thrust head for mounting thrust bearing elements;
a plurality of cylindrical diamond faced thrust bearing elements, one mounted in each of said openings;
an eccentric interior locking ring means on said unitary sleeve; and
means on said drive shaft cooperating with said interior locking ring means for locking said unitary bearing sleeve to said drive shaft.

4,710,037

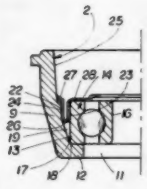
BEARING RETAINER STRUCTURE

Barry M. Newberg, Creve Coeur, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Sep. 4, 1986, Ser. No. 903,419

Int. Cl.[4] F16L *35/077;* **B23P** *19/04*

U.S. Cl. 384—537 **22 Claims**



1. In combination, an improved end assembly structure for an electric motor comprising:
an endshield adapted to be mounted adjacent one end of said motor;
a bearing hub in said endshield, said hub having support means to support a bearing thereon;
an annular bearing having an outer periphery, said bearing being mounted in said bearing hub with one face thereof resting on said support means of said hub to permit a rotor shaft of said motor to be journaled therein, said hub having an inner wall radially spaced from said outer periphery of said bearing, said bearing and said hub being sized relative each other to provide a preselected space between said inner wall of said hub and said opposed outer periphery of said bearing, said space extending from one face of said bearing to the opposite face to eliminate the need for machining operations; and,
fastening means adapted to be inserted into press-fit relation in said preselected space between said hub and bearing in contact with said inner wall of said hub and said outer periphery of said bearing to retain said bearing firmly in position to absorb torsional, axial and radial thrusts of a rotor shaft journaled in said bearing.

4,710,038

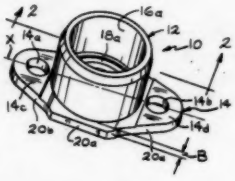
BEARING CAP ASSEMBLY

Erin D. Hennon, Lima, and Thomas J. Keller, Cridersville, both of Ohio, assignors to Dana Corporation, Toledo, Ohio

Filed Dec. 2, 1985, Ser. No. 803,586

Int. Cl.[4] F16C *19/22;* **F16D** *3/30*

U.S. Cl. 384—569 **7 Claims**



1. A bearing cap and mounting plate assembly comprising:
an open ended bearing cap having an axis and a generally cylindrical sidewall parallel to said axis and a closed end wall attached to said sidewall and perpendicular to said axis, said cylindrical sidewall defining an outer diameter;
a mounting plate generally parallel to and securely attached to said end wall of said bearing cap, said mounting plate including a mounting surface in facing relationship with said bearing cap;
said mounting surface having a central surface portion secured to the outer surface of said end wall and first and second spaced apart end surface portions located on opposite sides of said central surface portion and spaced outwardly past the sidewall of said bearing cap;
said end surface portions connected to said central surface portion along first and second boundary lines, said first and second boundary lines being spaced from one another by a distance at least as great as said outer diameter of said bearing cap; and
said end surface portions being raised relative to the area of said central surface portion lying adjacent to said first and second boundary lines.

4,710,039

CAGE FOR ROLLER BEARING

Klaus Huttner, Heidenfeld, Fed. Rep. of Germany, assignor to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Mar. 4, 1987, Ser. No. 21,476

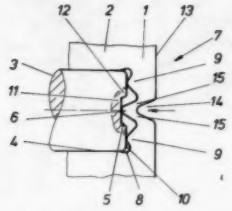
Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608184

Int. Cl.[4] F16C *33/54*

U.S. Cl. 384—574 **5 Claims**

1. In a roller cage, comprised of a substantially cylindrical sheet metal sleeve having closed pockets for receiving rollers, the cage having annular side ring defining the sides of the pockets, the rollers having depressions in their end surfaces, and holding projections extending from said side rings into the recesses of the rollers; the improvement wherein guide projec-

tions are provided extending axially into said pockets from said side ring on each side of the respective holding projection, said guide projections engaging annular end surfaces of said rollers radially outside of said recesses, the portion of said cage between said holding projection and guide projections being axially spaced from the transition region of the ends of said rollers between said recesses and the annular end surfaces thereof.

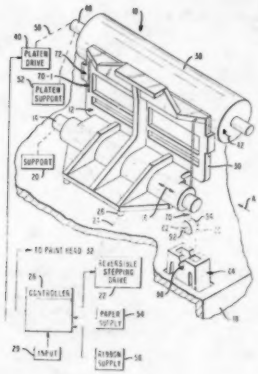


4,710,040

PRINTER HAVING CONSTANT PRESSURE BETWEEN PRINT HEAD AND PLATEN

Michael O. Grey, Ithaca, N.Y., assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 2, 1985, Ser. No. 804,019
Int. Cl.[4] B41J *11/20, 3/04*
U.S. Cl. 400—55 **1 Claim**



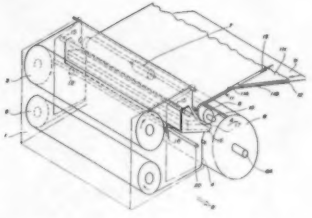
1. A printer comprising:
a frame;
a platen mounted on said frame and having a longitudinal axis;
a print station;
means for feeding printing media to said print station;
a carriage mounted on said frame and having a print head thereon, and means for moving said carriage with said print head thereon in reciprocating movement parallel to the longitudinal axis of said platen and relative to said print station; and
means for biasing said print head towards said platen comprising:
at least one biasing member having first and second end portions;
said first end portion having an offset portion which is pivotally mounted in said carriage so as to bias said print head into printing relationship with the printing media at said print station; and
mounting means secured to said frame to slidably receive said second end portion of said biasing member for sliding movement in a plane and to enable said second end portion to be pivoted about a pivoting axis which is substantially perpendicular to said plane as said carriage is moved;
said biasing member having a central portion with said first and second end portions being joined to said central portion;
said second end portion being offset at an angle relative to said central portion; and
said first and second end portions and said central portion lying in a common plane, with said first and second end portions being located on the same side of said central portion;
said mounting means comprising a base member secured to said frame and a pivoting member pivotally mounted in said base member to pivot about said pivoting axis;
said pivoting member having an aperture therein to slidably receive said second end portion of said biasing member for said sliding movement in said plane;
said base member having an opening therein which leads to an arcuately-shaped recess therein;
said pivoting member having aligned, cylindrical projections extending from opposed sides thereof, with said cylindrical projections having portions removed to produce flat areas thereon to enable said pivoting member to pass through said opening in said base member and to be retained in said arcuately-shaped recess upon an approximately ninety-degree rotation of pivoting member; and
said aperture in said pivoting member being substantially perpendicular to a plane including at least one of said flat areas on said cylindrical projections.

4,710,041

HEAT-TRANSFER THERMAL RECORDING DEVICE

Mitsuhiro Shimada; Junichiro Matsumoto, both of Nara; Susumu Nonaka, Yamatokoriyama, and Haruo Sayama, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 790,520, Oct. 23, 1985, abandoned. This application Mar. 26, 1987, Ser. No. 31,178
Claims priority, application Japan, Oct. 23, 1984, 59-223478; Oct. 26, 1984, 59-226449
Int. Cl.[4] B41J *3/02*
U.S. Cl. 400—120 **9 Claims**



1. A vertical cassette unit for use in combination with a heat-transfer thermal recording device for recording/printing color pictures by selective heating of multi-colored segmented ink film tape on color picture recording paper by a thermal line head consisting of:
a case having a continuous rear panel, a concave, U-shaped continuous front panel, two side panels shaped so as to conform to the U-shaped configuration of said front panel and superior and inferior apertures formed in upper and lower front edges of said U-shaped front panel, respectively;
ink film tape supply reel rotatably mounted at both ends thereof by a rotary shaft on said side panels in an upper rear interior portion of said case;

ink film take-up reel rotatably mounted at both ends thereof by a rotary shaft on said side panels in a lower rear portion of said case below said supply reel, one end of said take-up reel being provided with a gear connector which protects from a corresponding side panel to be connected to a drive source; and

a multi-colored segmented ink film tape in the form of a continuous sheet having two end portions wound on said supply reel and take-up reel, each of said two end portions being engaged by said respective supply reel and take-up reel, said ink film tape traversing from said supply reel to said take-up reel via said superior and inferior apertures in front of said U-shaped front panel forming a space between said ink film tape and said front panel such that a thermal line head may be rotatably installed in said space laterally between both sides of said cassette unit, parallel to said continuous sheet of said ink film tape.

4,710,042

METHOD AND APPARATUS FOR INDEXING THE PRINT HAMMER OF TYPEWRITERS OR THE LIKE

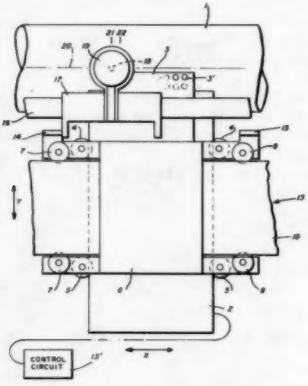
Manfred Moritz, Nuremburg, and Wilfried Rettke, Altdorf, both of Fed. Rep. of Germany, assignors to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Apr. 23, 1986, Ser. No. 855,113

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515108

Int. Cl.[4] B41J *9/14, 1/16*

U.S. Cl. 400—141 **11 Claims**



1. In a typewriter having a print hammer and a type matrix supporting type characters in rows and columns and being positionable to present a character in a selected row and column for printing by the print hammer, the improvement comprising

a linear motor having a rotor adapted to be energized to effect movement of said rotor in row and column directions, said type matrix being connected to said rotor,

rotor guide means driven by said rotor when energized,

a hammer carrier supporting said print hammer, and

first means on said guide means and hammer carrier for carrying along said print hammer carrier to position said print hammer to the next printing position when said rotor is energized to move in a columnar typing direction, and for carrying along said print hammer carriage to position it at the beginning of a line of print when said rotor is energized to effect a carriage return.

4,710,043

IMPACT PRINTER WITH VARIABLE DELAY FOR PRINT CYCLE BASED ON DIFFERENT PRINT-HAMMER ENERGY LEVELS

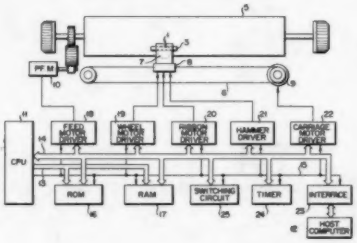
Tsuyoshi Matsushita, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Apr. 7, 1986, Ser. No. 849,060

Claims priority, application Japan, Apr. 18, 1985, 60-83089

Int. Cl.[4] B41J *1/30*

U.S. Cl. 400—144.2 **7 Claims**



1. A printing device comprising:

a printing wheel having types formed at respective outer end portions of its respective spokes;

printing wheel driving means responsive to a wheel drive signal to rotate the printing wheel so that it is set to a printing position designated by an input character code;

a printing ribbon driver;

a printing hammer;

a printing hammer driving means for driving the printing hammer with a printing energy corresponding to energy data;

carriage having the printing wheel, printing ribbon driver and printing hammer fixed thereto;

a platen;

a carriage driving means for driving the carriage along the platen so that it is set to a printing position;

memory means for storing energy data and time data corresponding to the character code representing the type; and

control means for reading energy data and time data corresponding to the input character code and for supplying the energy data from the memory means to the printing hammer driving means when the printing wheel is set to a printing position designated by the input character code and preventing the operation of the carriage driving means over a time period corresponding to the time data from the memory means after the printing hammer has been driven with a printing energy corresponding to the energy data.

4,710,044

RIBBON CASSETTE WITH END OF RIBBON DETECTOR

Rolf Ackermann, Nuremberg, Fed. Rep. of Germany, assignor to Ta Triumph-Adler Aktiengesellschaft, Nuremberg, Fed. Rep. of Germany

Filed Jan. 9, 1987, Ser. No. 1,958

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1986, 3601482

Int. Cl.[4] B41J *32/00, 35/36*

U.S. Cl. 400—208 **6 Claims**

1. An apparatus for use in a typewriter, comprising

a ribbon cassette, a ribbon cassette holder therefor, and means for drawing off ribbon from a supply spool in the ribbon cassette,

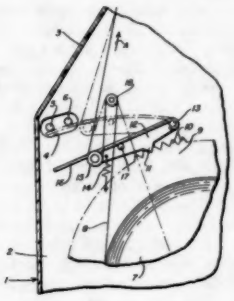
said ribbon cassette pivotably mounting a ribbon tensioning lever biased to normally engage said supply spool and operable in response to pull on the ribbon to draw off ribbon to release and then to reengage said supply spool

after a length is drawn off, thereby to maintain ribbon tension, and

an end of ribbon detector comprising

two contact pins spaced at predetermined locations, and

a springy contact web on said tensioning lever for bridging said contact pins when said tensioning lever is pulled by ribbon tension due to an end of ribbon condition to a respective contact making position, said springy contact web having a respective electrically conductive part for electrically bridging said contact pins, said contact pins being positioned on a line which



is not parallel to said springy contact web when said springy contact web first contacts one of said pins, continued movement of said tensioning lever after said springy contact web contacts one of said pins causing said springy contact web to bend so that said springy contact web when bent simultaneously contacts both of said pins, wherein said bridging of said contact pins by said springy contact web requires said ribbon tension to be sufficient to bend said springy contact web by a predetermined amount according to the spacing of said contact pins.

4,710,045

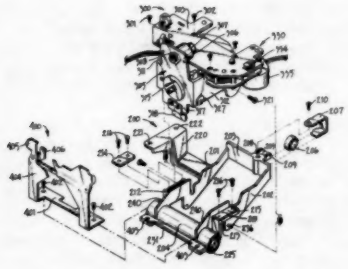
DIASYWHEEL PRINTER WITH IMPROVED ADJUSTABLE CARRIAGE ASSEMBLY AND CARTRIDGE LATCHING MEMBER

Sam K. Lim, San Jose, Calif., assignor to Genicom Corporation, Waynesboro, Va.

Division of Ser. No. 762,021, Aug. 1, 1985, which is a continuation of Ser. No. 538,606, Oct. 3, 1983. This application Mar. 18, 1986, Ser. No. 841,080

Int. Cl.[4] B41J *11/22, 11/20, 19/56*

U.S. Cl. 400—352 **6 Claims**



1. A carriage assembly for a printing device having a print mechanism to be translated along a linear print path, said carriage assembly comprising:

upper carriage means for supporting said print mechanism;

lower carriage means for supporting said upper carriage means, said lower carriage means comprising a unitary member having a pair of laterally spaced arm members each having an open pivot slot and a support ramp portion located rearwardly of said slot, a rear tube portion joining said arm members at the rear, a front cross brace joining said arm members at the front, said rear tube portion being dimensioned to accommodate a first carriage support rod, and front bearing means carried by said front cross brace and dimensioned to accommodate a second carriage support rod so that said lower carriage means is carried by said first and second carriage support rods;

said upper carriage means including a pair of laterally opposed laterally extending support studs, each received in a different one of said pivot slots and removably supported thereby, and a pair of laterally opposed adjustable guide members, each located rearwardly of the respective one of said support studs, said guide members normally engaging corresponding support ramp portions when said carriage assembly is in a first operative position to establish the relative positions of said upper and lower carriage means; and

spring means coupled between said upper and lower carriage means in the region adjacent the pivot portions and arranged to provide a spring detent for said upper carriage means with respect to said lower carriage means in said first operative position and in a second inoperative position.

4,710,046

PLATEN CLUTCH MECHANISM

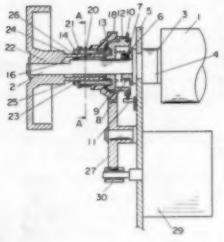
Hiroaki Ookubo, Kurume, Japan, assignor to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Filed Jul. 10, 1985, Ser. No. 753,565

Claims priority, application Japan, Jul. 10, 1984, 59-142726

Int. Cl.[4] B41J *19/96, 11/24*

U.S. Cl. 400—556.2 **2 Claims**



1. A platen clutch mechanism comprising:

a shaft having a platen fixedly mounted thereon;

a knob mounted on said shaft and axially movable therealong and having at least one projection thereon extending parallel to said shaft;

a first clutch member fixedly mounted on said shaft and having a through hole therein offset from said shaft and through which said projection slidably extends;

a second clutch member movably mounted on said shaft on the opposite side of said first clutch member from said knob for movement along said shaft and resiliently engaged in clutching engagement with said first clutch member and engagable by said projection for being moved out of clutching engagement with said first clutch member when said knob is moved toward said first clutch member;

a driven gear rotatably mounted around said first clutch member and means between said driven gear and said second clutch member for slidably and rotatably engaging said driven gear with said second clutch member, and means for normally holding said driven gear in a substan-

tially fixed position along the axial length of said first clutch member; and

drive gear means in a fixed position along the axial length of said first clutch member and engaged with said driven gear at said substantially fixed position;

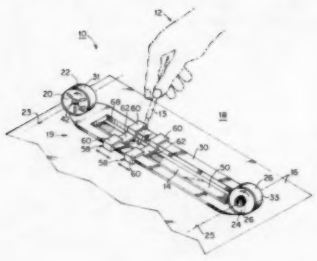
whereby with said clutch members engaged, said platen can be driven through said driven gear, and when said knob is moved toward said first clutch member, only said second clutch member is moved to move away from said first clutch member to be disengaged therefrom, so that said platen can be moved by rotation of said knob and at the same time said driven gear remains in said substantially fixed position and does not move relative to said drive gear means.

4,710,047

DESK-TOP CORRECTION RIBBON SYSTEM

Victor Barouh, 111 Wheatley Rd., and Seth Dinsky, 4 Deepwood Ct., both of Old Westbury, N.Y. 11568

Filed Jul. 12, 1985, Ser. No. 754,226
Int. Cl.[4] B41J *29/367*
U.S. Cl. 400—697 **14 Claims**



1. A system for positioning a correction ribbon having a dry correction material over an image on a surface for subsequent covering of said image, comprising, in combination,

a correction ribbon having a removable opaque correction material layer on one side of said ribbon,

supply means for holding and advanceably releasing an unused amount of said ribbon with said opaque material being aligned downwardly upon release, said supply means including a first cylindrical holder including a first cylindrical wall having a first axis and a first rear wall perpendicular to said first axis, said first rear wall and said first cylindrical wall defining a first cylindrical chamber, said supply means further including a supply spool member having a supply spindle and a circular supply spool outside wall perpendicular to said supply spindle, said unused amount of said ribbon being wound around said supply spindle, said first cylindrical chamber having a first open side opposite said first rear wall and being capable of receiving said supply spindle with said ribbon, said supply spindle being aligned with said first axis, said supply spool outside wall covering said first open side,

take-up means spaced from said supply means for receiving a used amount of said ribbon from said supply means, said take-up means including a second cylindrical holder including a second cylindrical wall having a second axis parallel to said first axis and a second rear wall perpendicular to said second axis, said second rear wall and said second cylindrical wall defining a second cylindrical chamber, said take-up means further including a take-up spool member having a take-up spindle and a circular take-up spool outside wall perpendicular to said take-up spindle, said used amount of said ribbon being wound around said take-up spindle, said second cylindrical chamber having a second open side opposite said second rear wall, said second cylindrical chamber being capable of receiving said take-up spindle with said ribbon, said take-up spindle being aligned with said second axis, said take-up spool outside wall covering said second open side,

track means connected to said supply means and said take-up means for holding down said unused amount of said ribbon against said image and providing a passage for said ribbon between said supply means and said take-up means, said first and second axes being transverse to said track means,

access means associated with said track means for aligning a portion of said unused ribbon over said image and for providing access to said ribbon, and

supply spool clip-on means and take-up spool clip-on means for holding said supply spool member and said take-up spool member in said first and second cylindrical chambers, respectively, said supply spool clip-on means and said take-up spool clip-on means including a first and second pair of biasable parallel elongated members, respectively, said elongated members having inner ends connected to said first and second rear walls of said first and second cylindrical holders spaced from said first and second axes and opposed outer ends spaced outwardly from said open sides of said first and secoond cylindrical chambers, said pair of elongated members further including a first pair of detent elements positioned at said outer ends, capable of being moved from normally unbiased modes of parallel relationship to biased modes wherein said first pair of detent elements move toward one another to a position closely spaced from one another, said elongated members having inner ends connected to said first and second rear walls of said first and second cylindrical holders spaced from said first and second axes and opposed outer ends spaced outwardly from said open sides of said first and second cylindrical chambers, said pair of elongated members further including a second pair of detent elements positioned at said outer ends, each said second pair of detent elements having an outer edge and having an outward taper at said outer edge, each said second pair of detent elements having a flat inner side facing said first and second rear walls, each said flat inner side and each said biasable elongated member forming a locking recess, said supply and take-up spool outside walls each having an inner rim with a circular flat outer surface said flat inner side of said second pair of detent elements being in pressing contact with said circular flat outer surface at said locking recess,

said supply spindle and said take-up spindle forming first and second cylindrical apertures, respectively, having first and second cylindrical inner surfaces, said first and second cylindrical apertures being capable of receiving said first and second pairs of detent elements in said biased mode during mounting of said supply and take-up spindles onto said first and second pairs of detent elemnts, said first and second inner surfaces riding along said outward tapers during the mounting process, said first and second pairs of biasable elongated members returning to the unbiased mode when said supply spool and said take-up spool outer walls become locked at said flat inner sides of said locking recesses,

ratchet means associated with said take-up spool member and said second cylindrical holder for keeping said take-up spool member from being rotated in a reverse direction upon rotation of said take-up spool member,

said second cylindrical wall having a flat rim surface at said second open side aligned perpendicular to said second axis, said ratchet means including said take-up spool outside wall having an inner surface rim in pressing contact with said flat rim surface, said flat rim surface having at least a portion of said flat rim surface forming first grooves, and said inner surface rim forming second grooves being capable of interlocking with said first grooves and preventing reverse rotation upon cessation of rotation of said take-up spool member.

4,710,048
APPLICATOR BOTTLE WITH SEALING CAP

Victor Vartoughian, 358 N. Ridgewood Pl., Los Angeles, Calif. 90004

Continuation of Ser. No. 518,419, Jul. 29, 1983, abandoned, which is a continuation of Ser. No. 246,726, Mar. 23, 1981, Pat. No. 4,447,169. This application Feb. 21, 1985, Ser. No. 704,901
Claims priority, application 05081983, May 8, 1983, PCT/US83/01201
The portion of the term of this patent subsequent to May 8, 2001, has been disclaimed.
Int. Cl.[4] A46B 11/00; A45D 34/00
U.S. Cl. 401—269 9 Claims

1. In an applicator dispenser bottle for dispensing a liquid or the like automatically the applicator dispenser having a brush, a liquid containing bottle body portion and a cap threadingly mounted to said bottle body portion, the improvement which comprises:

said bottle body portion being refillable and being substantially transparent and of a squeezable material, and having a neck at one end communicating with the interior thereof and a bottom at the other end with a cavity formed therein;

said brush including a bulbous closure portion for releasably and engageably fitting into said neck and a flange means for preventing said bulbous closure portion from extending more than a predetermined distance into said neck and a passageway through said closure portion;

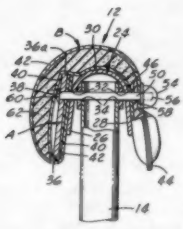
said cap, in a first position normally closing off said neck of said bottle body portion in a fluid tight seal relationship and defining a chamber between said cap and said bulbous closure portion, said cap, in a second position, being receivably and frictionally held in said cavity to provide an extension to said bottle body portion, and said brush further including a tapered portion to one side extending only partly into said chamber when said cap is in said first position;

said brush including a plurality of bristles retained therein, said bulbous closure portion of said brush having a surface conforming annularly to the upper interior surface of said cap wherein a fluid tight seal is provided for said chamber between said cap and said bulbous closure portion of said brush when said cap is inserted over said brush and threaded onto said bottle body portion.

4,710,049
SAFETY HINGE

Chang Chang, Monterey Park, Calif., assignor to Virco Mfg. Corporation, Los Angeles, Calif.

Filed Jan. 30, 1987, Ser. No. 9,517
Int. Cl.[4] F16B 11/00
U.S. Cl. 403—23 6 Claims



5. A protective covering for covering a hinge mechanism of the character embodied in infant furniture and having a pivot plate provided with an aperture therethrough, a pivot pin removably receivable within said aperture, a head affixed to one end of said pivot pin and a pivotally movable member having an aperture therethrough for receiving said pivot pin, said protective covering means comprising:

(a) a first portion receivable between said head of said pivot pin and said pivot plate, said first portion having an aperture therethrough indexable with said aperture in said pivot plate;

(b) a second hollow portion connected to said first portion said second hollow portion being foldable over said first portion, said pivot plate and said pivotally movable member and having an edge portion provided with an aperture therethrough indexable with said apertures in said pivot plate and said pivotally movable member when said second hollow portion is folded over said pivot plate and said pivotally movable member;

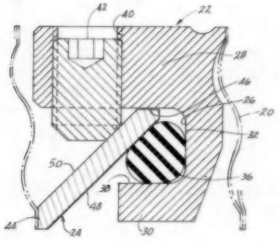
(c) pad means carried within said second hollow portion for padding said pivot plate and said pivotally movable member when said second hollow portion is folded thereover; and

(d) cap means connectable with said other end of said pivot pin for engagement with said second hollow portion for holding said hollow portion in a folded position.

4,710,050
MODULAR METALLIC BELLOWS ASSEMBLY

Richard R. Larsen, Port Orange, Fla., assignor to Pacific Scientific Co., Anaheim, Calif.

Filed Oct. 20, 1986, Ser. No. 921,231
Int. Cl.[4] F16B 7/10
U.S. Cl. 403—51 12 Claims



1. A coupling for connecting a first member to a second member comprising:

a female coupling portion operatively attached to the first member, said female coupling portion containing an annular recess therein;

resilient sealing means received within said annular recess in said female coupling portion;

a male coupling portion operatively attached to the second member, said male coupling portion having a conical configuration and being receivable within said annular recess in said female coupling portion and being positioned therein so as to contact said resilient sealing means; and

means for applying a radially inwardly directed force to said male coupling portion said male coupling portion to move axially into said female coupling portion compressing said resilient sealing means between said male coupling portion and said female coupling portion.

4,710,051

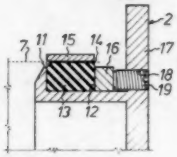
DEVICE FOR FASTENING A CLOSED CASING

Jan E. L. Karmazin, Norregatan 5, S-230 10 Skanör, Sweden

Filed May 27, 1986, Ser. No. 866,768

Int. Cl.[4] F16B *7/04*; B07B *1/49*

U.S. Cl. 403—227 **6 Claims**



1. Apparatus for use in assembling a screening drum, comprising a circumferentially closed cylindrical wire cloth screen which is open at both ends, and at least one end supporting means attachable to one end of said screen for circumferentially supporting said one end of said screen, said end supporting means including a supporting member having a cylindrical outer surface of substantially the same diameter as said screen and axially insertable into said one end of said screen, an annular elastic engagement element received in a circumferential groove in said cylindrical surface and having an outer circumferential surface of substantially the same diameter as said cylindrical surface so that said engagement element is insertable into said one end of said screen with said cylindrical surface, mounting ring means having an inner diameter slightly greater than the diameter of said screen and receivable over said one end of said screen outwardly of the inserted engagement element, and pressure applying means for effecting circumferential clamping of said screen between said mounting ring means and said elastic engagement element and for deforming said engagement element such that a furthest inserted circumferential portion of said engagement element is forced outward from said cylindrical surface to circumferentially stretch said one end of said screen.

4,710,052

LINEAR COUPLING

Gerd Elger, Neftenbachstrasse 26, CH-8408 Winterthur, Switzerland

PCT No. PCT/CH85/00048, § 371 Date Nov. 27, 1985, § 102(e) Date Nov. 27, 1985, PCT Pub. No. WO85/04456, PCT Pub. Date Oct. 10, 1985

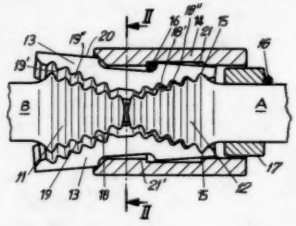
PCT Filed Mar. 28, 1985, Ser. No. 810,325

Claims priority, application Sweden, Mar. 28, 1984, 1549/84; Sep. 14, 1984, 4381/84

Int. Cl.[4] F16B *7/18*

U.S. Cl. 403—310 **2 Claims**

1. Linear coupling for the transmission of large tractive and alternating forces free from play comprises two coupling links and coupling means for interconnecting said coupling links, each said coupling link comprises a rod end portion (A, B) and a truncated cone (11, 12), having a central axis with said cone connected to and extending axially from said end portion, each of said cones (11, 12) being substantially similar and having a conically shaped exterior surface extending in the axial direction with a waveform (19) configuration comprising alternating lands (19′) and grooves (19″) extending transversely of the axial direction, each said cone (11, 12) having a smaller diameter and a larger diameter and with the larger diameter ends connected to the respective end portions (A, B) and the smaller diameter ends disposed in adjacent facing relation, said coupling means comprises an elongated annular coupling member (13) having an axis extending generally parallel with the axes of said cones formed of a number of elongated circular segments (13), said circular segments (13) having an axial length substantially equal to the combined axial lengths of said cones, said segments having an inner surface (18) and an outer surface (20) extending circumferentially around said cones and a pair of opposite ends extending transversely of the axis of said connecting member, the inner surface (18) of said segments having alternating lands (18′) and grooves (18″) arranged to interfit with the corresponding said grooves (19″) and lands (19′) of said cones (11, 12), said inner surface (18) of said segments (13) being conically shaped converging inwardly from each of the opposite ends to approximately mid-way between the opposite ends, the outer surface (20) of said segments forming a cylindrically shaped surface with an annular groove (21′) approximately mid-way between the opposite ends thereof, said coupling means also includes an axially extending annular sliding coupling sleeve (14) generally coaxial with and laterally encircling said segments (13), said sliding coupling sleeve (14) having an inner surface and an outer surface with said inner surface being cylindrically shaped and having an annular groove (21″) therein corresponding to said annular groove (21′) in said segments, said sliding coupling sleeve (14) being axially displaceable between an unlocked position with said annular groove (21″) therein out of register with said annular groove (21′) in said segments (13) and a locked-position with said annular groove (21″) in said sliding coupling sleeve in register with said annular groove (21′) in said segments, a bearing ring on one of said end portions (A, B) adjacent to and spaced axially from the larger diameter end of said cone attached to said end portion, and a twin U-shaped spring clip-like stirrup (16) with said stirrup having a pair of webs spaced apart and extending transversely of the axial direction of said sliding coupling sleeve, and legs extending in the axial direction of said sliding coupling sleeve and interconnecting said webs, one of said webs located within said annular grooves (21′, 21″) in said segments (13) and said sliding coupling sleeve (14) and the other said web arranged in the unlocked position of said sliding coupling sleeve in bearing contact with an end of said bearing ring (17) spaced more remotely from the adjacent said cone and in the locked position being located between said bearing ring (17) and the larger diameter end of the adjacent said cone.



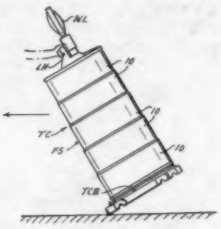
4,710,053
TRAFFIC CONTROL ELEMENTS

Jack H. Kulp, San Juan Capistrano, and Richard M. Cunningham, Huntington Beach, both of Calif., assignors to Lukens General Industries, Inc., St. Louis, Mo.

Continuation-in-part of Ser. No. 464,025, Feb. 4, 1983, Pat. No. 4,475,101, which is a continuation-in-part of Ser. No. 447,616, Dec. 7, 1982, abandoned. This application May 30, 1984, Ser. No. 615,878

Int. Cl.[4] E01F *9/00*

U.S. Cl. 404—9 **37 Claims**



1. A traffic control element comprising a molded, plastic, hollow element having a preselected configuration and a molded, plastic bse element adapted to be readily assembled and separated from the hollow element, the hollow element being mounted to the base element when it is arranged in a vertical traffic controlling position, the base element being adapted to store ballast means thereon for stabilizing the hollow element when the hollow element is arranged in said vertical position, the improvement comprising the base element having outwardly extending skid means integrally constructed therewith along one side thereof for permitting the assembled traffic control element to be slid across a surface on the skid means when the skid means are positioned into engagement with a surface and so defined to prevent the hollow element and the base element to become unintentionally separated during the sliding on the skid means.

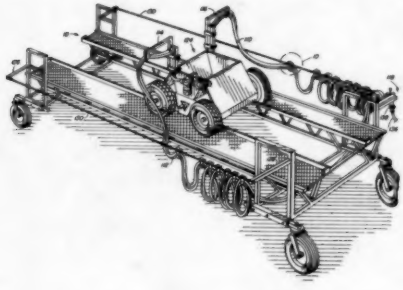
4,710,054
MATERIAL SPREADER SYSTEM

J. Dewayne Allen, Paragould, Ak., assignor to Allen Engineering Corporation, Paragould, Ak.

Continuation of Ser. No. 407,620, Aug. 12, 1982, abandoned, which is a continuation-in-part of Ser. No. 311,674, Oct. 15, 1981, Pat. No. 4,540,312, which is a continuation-in-part of Ser. No. 170,126, Jul. 18, 1980, Pat. No. 4,349,294, which is a continuation-in-part of Ser. No. 101,545, Dec. 10, 1979, abandoned. This application Nov. 4, 1985, Ser. No. 794,574

Int. Cl.[4] E01C *19/18*

U.S. Cl. 404—110 **17 Claims**



1. Self-propelled apparatus for uniformly spreading topping material over a substantially planar, non-load bearing plastic concrete surface having a length, width, first and second opposing sides and a load supporting perimeter, comprising:

a. a spreader including a hopper for storing a supply of loose particulate topping material and for dispensing a uniformly wide and uniformly thick layer of topping material through a widthwise slot in said hopper as said spreader is translated along a path, the flow of topping material from within said hopper through said slot and onto the plastic concrete surface defining a topping flow path;

b. bridge means supported above and spanning the width of the concrete surface to provide a continuous, linear path for translating said spreader back and forth across the non-load bearing plastic concrete surface and for maintaining said spreader vertically spaced above and separated from the plastic surface, said bridge means including

i. At least one triangular truss bridge span including a load bearing base having an upper surface and first and second spaced apart edges for supporting said spreader, an apex element spaced apart from and extending parallel to said span base and first and second end sections, said first and second edges and said apex element defining the triangular cross section of said bridge span;

ii. guide means coupled to said span base and including a linear, vertically oriented surface defining a linear path along said span;

iii. first and second bridge support units coupled to said first and second bridge span end sectional for engaging the load supporting perimeter surrounding said plastic concrete surface at spaced apart positions on each side of said concrete surface to elevate said bridge span above the plastic concrete surface;

iv. means including first and second roller units coupled to said bridge support units and contacting the load supporting perimeter on each side of the concrete surface for translating said bridge means along the load supporting perimeter, wherein said first roller unit engages the load supporting perimeter on one side of said concrete surface and said second roller unit engages the opposite side of the load supporting perimeter;

c. spreader to bridge coupling means for transferring the weight of said spreader to said bridge span load bearing base, for engaging the vertically oriented surface of said guide means at first and second spaced apart intervals to direct said spreader along the linear path defined by said guide means and for engaging said bridge span at first and second spaced apart intervals along the length of said bridge span to maintain a fixed planar relationship between said hopper and said bridge span as said spreader is translated back and forth along said bridge span to thereby maintain a fixed planar relationship between said spreader and the underlying, substantially planar plastic concrete surface, said spreader to bridge coupling means including

i. a first wheel assembly including at least one rolling member engaging said bridge span at a first location and including a first axis of rotation;

ii. a second wheel assembly including at least one rolling member engaging said bridge span at a second location spaced apart from said first location and including a second axis of rotation;

d. flow control means including rotating metering means positioned in series with the topping flow path through said widthwise slot for positively controlling the discharge of topping material through said slot at a rate related to the rotational velocity of said rotating metering means and independent of the vertical spacing between said widthwise slot and the plastic concrete surface, said rotating metering means including a drive shaft having an axis of rotation spaced apart from the first axis of rotation and from the second axis of rotation;

e. rotary drive means coupled to and forming a part of said spreader for rotating the rolling member of said first wheel assembly and for rotating the spaced apart drive shaft of said rotating metering means; and

f. drive control means coupled to said rotary drive means for controlling the direction of movement of said spreader along said bridge span and for energizing and deenergizing said rotating metering means;

whereby sequential translations of said spreader across said bridge means followed by sequential translations of said bridge means along the length of said area in displacements related to the width of the layer of topping material dispensed by said spreader covers the entire surface of said area with a uniform layer of topping material.

4,710,055

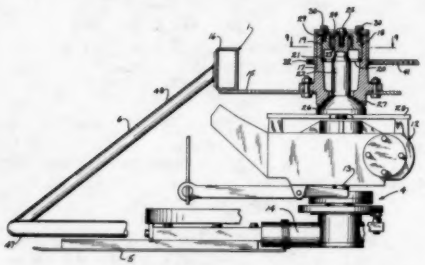
RIDING-TYPE MULTIPLE TROWEL MACHINE

Helmut Maass, West Bend, and Joseph H. Klatzka, Hartford, both of Wis., assignors to M-B-W Inc., Slinger, Wis.

Filed Jul. 2, 1986, Ser. No. 881,255

Int. Cl.[4] E01C *19/22*

U.S. Cl. 404—112 **11 Claims**



1. A riding-type surface working machine, comprising a frame, at least one rotor means mounted on the frame, surface working means carried by said rotor means and adapted to rotate in contact with a surface to be worked, an eccentric carried by said rotor means and mounted for rotation relative to said frame, mounting means for mounting said rotor means for universal tilting movement with respect to said frame, drive means for rotating said rotor means about its axis to thereby rotate said surface working means, and operating means for rotating said eccentric and thereby tilting said rotor means to cause selective directional movement of said machine.

4,710,056

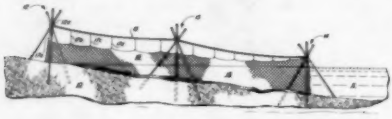
METHOD AND APPARATUS FOR RESTORING A BEACH

William L. Parker, 220 21st St. S.W., Naples, Fla. 33964

Continuation of Ser. No. 823,739, Jan. 29, 1986, abandoned. This application Mar. 10, 1987, Ser. No. 22,578

Int. Cl.[4] E02B *3/04, 3/06*

U.S. Cl. 405—15 **9 Claims**



1. A method of restoring a sandy beach by raising the level of the beach between the high tide line and at least the low tide line of the beach comprising

suspending by a temporary supporting structure an elongated net generally perpendicular to the high tide line of the beach and extending from the high tide line to at least the low tide line,

said net being made of flexible material and having a uniform mesh sized to prohibit passage through said net of the larger rocks, coral and shells present on the sea floor,

said net having a weighted bottom edge, resting upon the sea floor and a top edge suspended above the high tide level of the sea,

leaving said net suspended between the high tide line and at least the low tide line for a period of not less than twelve hours to cause the gradual buildup of rocks, coral, shells and sand along the lower portion of the net,

and then removing said net and its supporting structure from the beach.

4,710,057

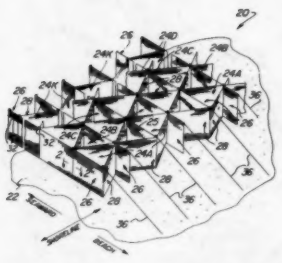
METHOD AND APPARATUS FOR BUILDING UP BEACHES AND PROTECTING SHORELINES

James E. Laier, 2620 Wagon Wheel Dr., Mobile, Ala. 36609

Filed Oct. 3, 1986, Ser. No. 915,186

Int. Cl.[4] E02B *3/04*

U.S. Cl. 405—30 **18 Claims**



1. A system for controlling erosion of a beach at a seabed through sedimentation of sand caused by wave action, said system comprising a plurality of interconnected compartments disposed under the water on said seabed in an array extending generally parallel to the shoreline of said beach, said compartments being formed by plural flexible wall portions, each formed of an open mesh, buoyant material, said wall portions being anchored to said seabed in a generally vertical orientation by anchoring means, said anchoring means comprising means for holding said wall portions on said seabed, said wall portions flexing towards said beach with incoming waves, said anchoring means also comprising means for precluding said wall portions from flexing backwards substantially beyond said vertical orientation with backwash waves, the mesh of said wall portions decreasing the velocity of the water flowing therethrough on backwash waves, whereupon sand suspended in said water is enabled to drop out of suspension within said compartments during said backwash waves to settle therein and thus automatically fill said compartments.

4,710,058

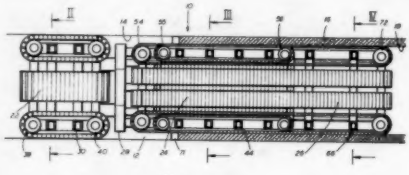
CONCRETE LINING MACHINE

Man Y. Han, Y-4-A Hensel Apt., College Station, Tex. 77840

Filed Feb. 25, 1987, Ser. No. 18,478

Int. Cl.[4] E21D *11/10*

U.S. Cl. 405—146 **31 Claims**



1. Apparatus positionable behind a tunnel boring machine for forming a concrete lining in a tunnel by injecting a concrete

mixture in the annulus between the earthen walls of the tunnel and the apparatus, the apparatus including driving means for moving said apparatus within the tunnel and having a passageway for transmitting earthen material from adjacent the tunnel boring machine through the apparatus, the apparatus further comprising:

a first machine portion having a first portion frame;

a plurality of first endless loop chains each including a plurality of first plates each movably mounted about said first portion frame, each of said first endless loop chains having a portion for lying within a first longitudinal plane adjoining the earthen walls for temporarily supporting the earthen walls of the tunnel;

a second machine portion having a second portion frame;

a plurality of second endless loop chains each including a plurality of second plates each movably mounted about said second portion frame, each of said second endless loop chains having a portion for lying within a second longitudinal plane adjoining the interior surface of the concrete lining;

a plurality of third endless loop chains each including a plurality of third plates each movably mounted about said second frame, each of said third endless loop chains having a portion for lying within the second longitudinal plane adjoining the interior surface of the concrete lining;

said second and third plurality of plates being arranged in respective second and third chains alternately spaced about the periphery of the second portion frame and together forming a substantially sealed tubular surface for sealing from said second frame concrete injected in the annulus between the earthen walls and said plurality of second and third plates;

a third machine portion having a third portion frame; and

said second plurality of plates each being movably mounted about said third portion frame and arranged in one of said second plurality of endless loop claims for temporarily supporting the concrete lining downstream from the second machine portion as the apparatus moves through the tunnel in response to said driving means.

4,710,059

METHOD AND APPARATUS FOR SIMULTANEOUS TRENCHING AND PIPE LAYING IN AN ARCTIC ENVIRONMENT

Billy M. Hazlegrove, and Richard A. Roberts, both of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed Nov. 24, 1986, Ser. No. 934,016
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—162 **25 Claims**

1. Apparatus for simultaneously trenching and laying submarine pipeline within the bed of a body of water covered with an ice mass, comprising

a vehicle capable of advancing over an ice mass in the direction of a pre-assembled pipeline to be laid;

means for creating a slot-like opening of indeterminate length in the ice mass, ahead of the advancing vehicle;

a submersible dredging means for excavating a submarine trench in the bed of the body of water, into which the pipeline is to be laid;

a support means for carrying and deploying the dredging means, the support means having a longitudinally aligned slot, and having a first end pivotally connected to the vehicle and a second, submersible end which carries the dredging means, the support means being operably disposed through the opening in the ice mass such that the dredging means is able to excavate a subterranean trench to a predetermined depth;

means pivotally secured to and extending between the vehicle and an intermediate portion of the support means for raising and lowering the support; and

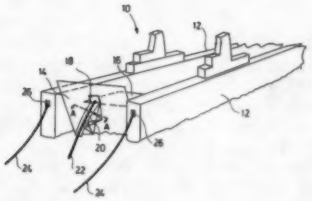
pipeline means having a surface component, a submerged component and an entrenched component, the submerged component intersecting with the support means through the longitudinally disposed slot, such that the slot provides support to the submerged component of the pipeline at a location between the midpoint of the submerged component and the surface of the water.

4,710,060

WATER VESSELS OF THE FLOATING-DECK TYPE

Jorma Kämäräinen, Espoo, Finland, assignor to Valmet Oy, Finland

Filed May 2, 1986, Ser. No. 858,946
Claims priority, application Finland, May 8, 1985, 851813
Int. Cl.[4] F16L *1/04*
U.S. Cl. 405—166 **14 Claims**



1. In a water vessel of the floating-dock type which includes a pair of spaced side walls, a cargo deck extending between said side walls defining a cargo space, and a door situated at the stern of said vessel, an improvement for adapting the vessel for seismic or like research comprising:

a platform for supporting research equipment mounted above siad cargo deck and extending between said side walls;

research equipment including at least a measurement cable mounted on a reel, said research equipment supported on said platform;

means for passing said measurement cable from said reel through said stern door into the sea;

at least one of said side walls of vessel being provided with an interior space therewithin;

a transmitter cable for generating an impulse to be measured situated in said interior space provided within a respective side wall; and

means for passing said transmitter cable through a stern end of a respective side wall to lower said transmitter cable into the sea.

4,710,061

OFFSHORE WELL APPARATUS AND METHOD

Christon R. Blair, Spring, Tex., and Kenneth B. Parker, Anchorage, Ak., assignors to Atlantic Richfield Company, Plano, Tex.

Division of Ser. No. 722,853, Apr. 12, 1985. This application Oct. 6, 1986, Ser. No. 915,359
Int. Cl.[4] E02B *17/00*
U.S. Cl. 405—195 **5 Claims**

1. A method of saving a well located offshore in a first depth of water having a surface and above a bottom, comprising the steps of:

a. completing the well with a wellhead located on the top of a main casing protruding above the surface of the water;

b. emplacing a landing means adjacent the main casing;

c. attaching a first respective end of each of a plurality of at least three cables to said respective plurality of respective anchor piles and driving said anchor piles with the cables connected thereto into the bottom at respective azimuths and distances about the well;

d. movably affixing a plurality of clamping means on said main casing; said clamping means being movable with respect to said main casing; said clamping means including

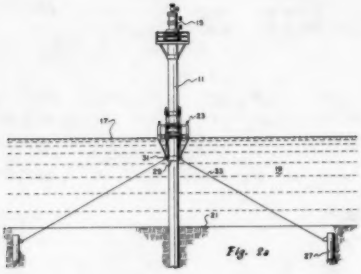


Fig. 2a

an upper clamping means and a cable clamp movably connected with said main casing a predetermined distance below said upper clamping means and at a predetermined distance below the surface of the water and supporting said plurality of at least three pulleys adapted for passing therethrough of said cables; and

e. running respective said cables upwardly through respective said pulleys and connecting said cables with said well after said cables are pulled taut against said anchor piles.

4,710,062

METAL STRIP FOR USE IN STABILIZED EARTH STRUCTURES

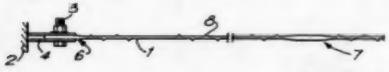
Henri Vidal, 8 bis, Boulevard Maillot, 92200 Neuilly-sur-Seine, France, and Daniel Weinreb, Rexdale, Canada, assignors to Henri Vidal, Neuilly-sur-Seine, France

Filed Jul. 3, 1986, Ser. No. 881,651

Claims priority, application United Kingdom, Jul. 5, 1985, 8517152

Int. Cl.[4] E02D *5/20*

U.S. Cl. 405—262 **22 Claims**



21. A stabilised earth structure comprising a plurality of facing units, an earth mass behind the facing units, a plurality of rolled metal strips extending rearwardly into the earth mass from the facing units, and fastening means for attaching the strips to the facing units, wherein each said strip is capable of sustaining tensile forces to which it is subjected in the earth mass, each said strip having a plurality of thickened reinforcement regions spaced at intervals along the length of the strip, said reinforcement regions being formed during the rolling of each said strip and each being between 40 mm and 100 mm in length, each said strip being cut to a desired length with one of said reinforcement regions being located at or near an end of the strip, an aperture being formed through the end reinforcement region and receiving said fastening means to attach the strip to a respective facing unit.

4,710,063

NON-RETURN VALVE FOR BORE HOLE SLEEVES

Eskil Faktus, Arjang, and Rolf Dahlen, Tocksfors, both of Sweden, assignors to Elektro Mekani Arjang AB, Arjang, Sweden

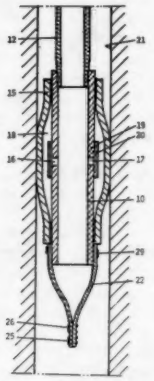
PCT No. PCT/SE85/00481, § 371 Date Jul. 25, 1986, § 102(e) Date Jul. 25, 1986, PCT Pub. No. WO86/03254, PCT Pub. Date Jun. 5, 1986

PCT Filed Nov. 25, 1985, Ser. No. 893,327

Claims priority, application Sweden, Nov. 28, 1984, 8406010

Int. Cl.[4] E21D *21/00*

U.S. Cl. 405—269 **13 Claims**



1. A non-return valve for use with a bore hole sleeve for injecting a sealing and/or reinforcing compound into rock cracks and similar apertures, the bore hole sleeve including a rigid case (**10**), one end (**10A**) of which is provided with means for detachable connection to the case of a pump hose (**12**) for the compound to be injected, as well as an expandable device (**15**) which is mounted on the rigid case and which is expandable into engagement with the wall of the bore hole to secure the rigid case in the bore hole (**21**), said non-return valve comprising: an elastic sleeve (**22**) which is connected at the other end (**10B**) of the rigid case (**10**) in such a way that the rigid case (**10**) runs into the elastic sleeve (**22**); and contraction means for flattening the free end of the elastic sleeve when no compound is being injected so that already-injected compound cannot flow backwards into the rigid case (**10**), the contraction means including mechanical means adjacent the free end of the elastic sleeve for providing two projecting folds (**27, 28**) in the wall of the elastic sleeve, the projecting folds being diametrically positioned in relation to each other.

4,710,064

MOVABLE ROOF SUPPORT AND BOLTER SYSTEM

Frank K. Stafford, Box 1434, and Robert C. Nasby, 236 Trolley Dr., both of Beckley, W. Va. 25801

Division of Ser. No. 723,045, Apr. 15, 1985, Pat. No. 4,676,697. This application Sep. 26, 1986, Ser. No. 912,331

Int. Cl.[4] E21D *15/00*

U.S. Cl. 405—290 **28 Claims**

1. A mine roof support system comprising:

a plurality of truss members each having first and second ends, said truss members being positioned in spaced relationship one behind another;

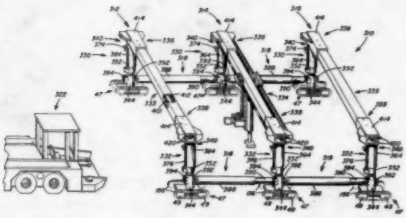
each said truss member having a major portion fabricated from a fiber glass material that has an elastic limit permitting deformation of said truss member under a load when in contact with a mine roof;

a plurality of vertically extensible props each having an upper end portion and a lower end portion and including means for extending and retracting said upper end portion

relative to said lower end portion to adjust a vertical height of said props;

one of said props being positioned under each of said ends of each said truss member;

said upper end portion of said prop being connected to a respective said end of said truss member so tat each said truss member is supported by a pair of said props for movement into and out of engagement with said mine roof;



ground engaging means for supporting each said prop at said lower end portion thereof for movement on a mine floor;

connecting means beneath said ends of said truss members for connecting adjacent props in tandem arrangement to permit limited horizontal movement of said truss members and associated props relative to each other; and

each said ground engaging means including a selectively operable propulsion unit capable of being operated to produce said horizontal movement of its respective said prop and said end of said truss member.

4,710,065

METHOD, A DEVICE AND A MEANS FOR CARRYING OUT WIRE BOLTING OF A ROCK

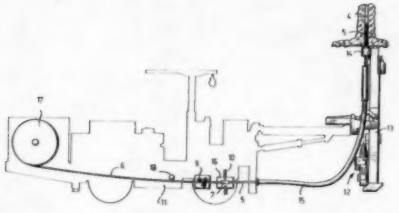
Jarmo Leppänen, Ylöjärvi, Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed Oct. 20, 1986, Ser. No. 920,597

Claims priority, application Finland, Nov. 7, 1985, 854377

Int. Cl.[4] E21D *20/02*

U.S. Cl. 405—303 **4 Claims**



1. A wire bolting device comprising:

a wire magazine holding at least one continuous wire;

a feeding mechanism for withdrawing the continous wire from the wire magazine;

wire cutting means for cutting the continous wire to form a cut wire section, said wire cutting means receiving said continuous wire to be cut from said feeding mechanism;

a guide pipe for receiving the cut wire section from the cutting means;

a head guide for receiving the cut wire section from said guide pipe, said head guide being positionable close to a drill hole having a depth, said cut wire section being pushed through said guide pipe and said head guide and into said drill hole by the remaining uncut continous wire being fed by the feeding mechanism, said cut wire section pushed into said drill hole being capable of being shorter in length than the depth of said drill hole;

a feeding beam for supporting said guide; and

a carrier upon which said feeding beam is mounted, said carrier additionally mounting drilling equipment.

4,710,066

METHOD AND APPARATUS FOR PNEUMATICALLY TRANSPORTING FILTER ROD SECTIONS AND THE LIKE

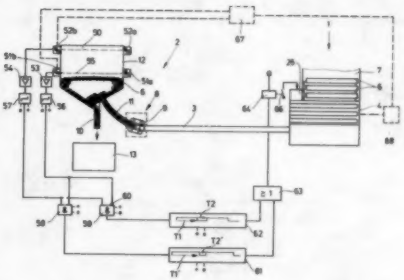
Peter Kägeler; Rudolf Bostelmann, both of Geesthacht, and Olaf Buhrmester, Schwarzenbek, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Nov. 1, 1985, Ser. No. 794,097

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1984, 3442168

Int. Cl.[4] B65G *51/02*

U.S. Cl. 406—29 **14 Claims**



6. Apparatus for pneumatically conveying rod-shaped articles, particularly sections of filter rods and other articles which constitute or form part of smokers' products, comprising a receiver; a pneumatic conveyor having an inlet and an outlet which is connected to said receiver; a source of articles; a sender connected to said inlet and having means for intermittently propelling into said conveyor by a gaseous fluid articles which are supplied by said source; and means for repeatedly interrupting the propulsion of articles by said sender upon completed propulsion of predetermined numbers of articles into said inlet so that first intervals of propulsion continuously alternate with second intervals of interruption of propulsion of articles regardless of the quantity of articles in said receiver.

4,710,067

ROTARY AIR LOCK FEEDER

Frank Salley, 4425 Peachtree-Dunwoody Rd., NE., Atlanta, Ga. 30342

Continuation-in-part of Ser. No. 689,477, Jan. 7, 1985, abandoned. This application Apr. 9, 1986, Ser. No. 849,691

Int. Cl.[4] B65G *53/46*

U.S. Cl. 406—64 **4 Claims**

1. A method of forming a stream of particulated material such as fibrous insulation comprising the steps of:

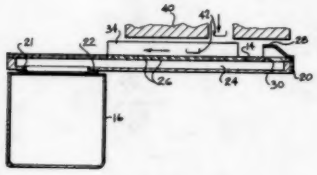
(a) passing an airstream through a cylindrical chamber having its axis oriented generally horizontally with the airstream passing substantially along a path offset from a plane extending vertically through the chamber axis;
(b) feeding particulated material into an upper portion of the chamber and forming it into batches; and
(c) successively moving the batches about the chamber axis to the bottom of the chamber and then lifting the material upwardly into the airstream with substantially the entire leading upper surfaces of the batches being at and entering the airstream at a slope substantially equal to the angle of natural repose of the material with the slope of the successive batches each being substantially the same as they enter the airstream, whereby the material is entrained into the airstream by erosion of the upper surfaces of the batches while not being substantially changed by gravity.

4,710,068

AIR CONVEYOR

Donald E. Lindstrom, Lakewood, and David T. Setzer, Long Beach, both of Calif., assignors to Reynolds Metals Company, Richmond, Va.

Filed Sep. 15, 1986, Ser. No. 907,443
Int. Cl.[4] B65G *53/16*
U.S. Cl. 406—88 **9 Claims**



1. A conveying system for objects comprising a conveying surface along which said objects are conveyed, an air plenum positioned beneath said conveying surface, said air plenum being in fluid flow connection with said conveying surface through a plurality of air jets within said conveying surface to provide an air cushion between said conveying surface and an end surface of said objects, an air duct in fluid flow connection with said air plenum and with a source of air, an acceleration hood in fluid flow connection with said air plenum, said acceleration hood being positioned above said conveying surface and behind an entry point for said objects to be conveyed along said conveying surface, and means for providing said objects to said conveying surface at said entry point and in front of said acceleration hood, said acceleration hood being constructed and arrannged to produce a stream of airflow generally parallel and along to said conveying surfce and against a side surface of said objects such that said acceleration hood provides initial acceleration of said objects along said conveying surface as they arrive at said conveying surface.

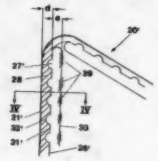
4,710,069

CUTTING INSERT FOR CHIP FORMING MACHINING

Kaj-Ragnar Loqvist, Fagersta, Sweden, assignor to Seco Tools AB, Fagersta, Sweden

Filed Jul. 7, 1986, Ser. No. 882,516
Claims priority, application Sweden, Jul. 9, 1985, 8503397
Int. Cl.[4] B23B *27/22*
U.S. Cl. 407—114 **14 Claims**

1. A cutting insert for chip-forming machining of workpieces, said insert including an upper face defining a rake face, and a side face intersecting said rake face to form a cutting edge for cutting chips from a workpiece; said rake face including an upsetting face extending rearwardly from said cutting edge, a curved chip breaking face including a first portion extending curvalinearly rearwardly downwardly from said upsetting face, and a second portion extending curvalinearly rearwardly upwardly from a rear end of said first portion; said rake face further including a plurality of depressions spaced apart in a direction parallel to said cutting edge and intersecting both said upsetting face and said chip breaking face, said depressions defining chip working means for working and



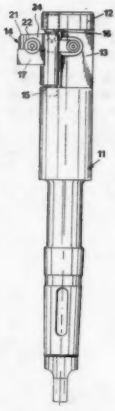
heating chips as portions thereof enter said depressions; a front end of said first portion of said chip breaking face disposed closer to said cutting edge than are rear ends of said depressions and farther from said cutting edge than are front ends of said depressions such that the chips are simultaneously bent by said chip breaking surface and heated by the working in said depressions.

4,710,070

DEVICE IN BACK SPOT FACING TOOLS

Per Alsen, and Timo Salo, both of Göteborg, Sweden, assignors to Erix Tool AB, Göteborg, Sweden

Filed Feb. 18, 1986, Ser. No. 830,134
Claims priority, application Sweden, Feb. 15, 1985, 8500707
Int. Cl.[4] B23B *51/00*
U.S. Cl. 408—93 **5 Claims**



1. A back spot facing tool of the type comprising a spindle and at least one wing having a curved external envelope surface and arranged in a recess at one front end portion of said spindle, said wing being pivotally mounted about an axis parallel witht he spindle and eccentric to the spindle axis, said wing being arranged upon rotation of the spindle to pivot from an inactive position inside the circumference of the spindle to an active position outside the spindle, the part of the wing projecting outside the spindle being provided with at least one cutting edge, characterized in that, when the wing is in its full active position, the part of the wing which is outside the spindle has an end surface provided with an inclined ramp having the maximum height as seen in the axial direction of the spindle at a portion located closest to the circumference of the spindle and that a transitional portion between the ramp and the enve-

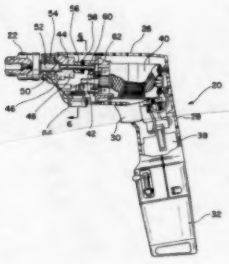
lope surface of the wing is slightly chamfered, in order to ensure that the portion of the wing, which during rotation projects from the spindle, at insertion of the tool in a bore in a work piece, engages the bore edge and is pivoted to inactive position upon continued displacement in the bore.

4,710,071

FAMILY OF ELECTRIC DRILLS AND TWO-SPEED GEAR BOX THEREFOR

Heinrich P. Koehler, Hanover, Pa., and John R. Dixon, Hampstead, Md., assignors to Black & Decker Inc., Newark, Del.

Filed May 16, 1986, Ser. No. 863,968
Int. Cl.[4] B23B *47/14*; F16H *3/32*
U.S. Cl. 408—133 **18 Claims**



1. A handheld electric tool, comprising:
an electric motor arranged to drive a tool holder through a gear transmission having different transmission ratios;
a gear shift element having a manual actuating member, said actuating member being movable between two positions for changing said gear transmission between high and low transmission ratios;
said gear transmission including an output shaft for driving said tool holder, and two output gears mounted on said output shaft for rotation of the latter;
said gear transmission also including a lay shaft having two lay shaft gears mounted thereon and in mesh respectively with said two output gears;
two dog clutch members mounted on said lay shaft;
a dog carrier member mounted on said lay shaft and having a dog slidably mounted therein;
said dog being disposed radially outwardly of and being slidable parallel to said lay shaft;
said gear shift element having an arm extending transversely to said lay shaft and engaging said dog for moving the latter between low and high transmission ratio positions, in said low transmission ratio position said dog engaging in one of said dog clutch members to effect drive from said motor to one of said lay shaft gears, and in said high transmission ratio position said dog engaging in the other of said dog clutch members to effect drive from said motor to the other of said lay shaft gears; and
said arm being flexible but only flexing after actuation of said manual actuating member if said dog does not immediately engage in the respective dog clutch member, said flexing then urging said dog to complete such engagement.

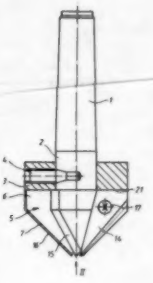
4,710,072

CONE DRILL BIT

Heinrich Heule, Kristallstrasse 6, Au, Switzerland (9434)

Filed Jun. 5, 1984, Ser. No. 617,560
Claims priority, application Fed. Rep. of Germany, Jun. 10, 1983, 3321110
Int. Cl.[4] B23B *51/00*
U.S. Cl. 408—18 **5 Claims**

1. A chamfering tool for cutting a conical chamfer in the rim of a bore hole, and having a central main longitudinal axis, comprising,
a main body and a conical chamfering head integral therewith, the chamfering head having a plurality of recesses distributed around said main longitudinal axis, and each including a pair of flat surfaces extending axially, and tangent to base circles, and directed horizontally in generally circumferential direction, said recesses disposed at less than 180°, but not less than 90°, relative to each other about the axis, each recess being without confining surfaces radially outwardly of said pair of surfaces thereby presenting a generally concave recess directed radially outwardly,



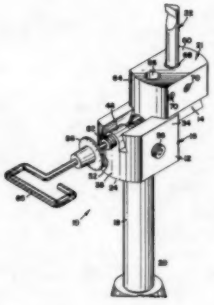
a plurality of cutting plates separate from said integral body and head, one in each of said recesses and bearing against both of said surfaces in the recesses, and
means detachably securing the cutting plates in said recesses, the securing means constituting the sole means confining the cutting plates against said surfaces.
5. A chamfering tool according to claim **1**,
in conjunction with a sharpening device that is in the design of the chamfering tool,
wherein, the cutting plate, in the sharpening device attached to the attachment member is inclined at 20′ of angle trailing in feed direction, and extends a predetermined distance radially outwardly from said central longitudinal axis.

4,710,073

TOOL APPARATUS FOR BORING A HOLE

Richard L. Peterson, Plymouth, Minn., assignor to Infinity Boring Tool Company, Minneapolis, Minn.

Filed May 5, 1986, Ser. No. 859,718
Int. Cl.[4] B23B *29/034*
U.S. Cl. 408—181 **2 Claims**



1. Tool apparatus for holding a cutting bar for boring a hole, comprising:

a primary member including a body with opposite first and second ends, opposite first and second sides and opposite third and fourth sides, said primary member further including a shank extending away from the first end of said body, said body having a channel in the second end between the opposite first and second sides, said channel having a bottom and opposite first and second side walls, said channel further having a partial end wall;

a slide having opposite third and fourth ends, said slidd including in the fourth end means for receiving said cutting bar, said slide including in the third end a guide for fitting into said channel of said body;

means, within said channel extending between said partial end wall and said guide, for adjustably sliding said guide along said channel thereby controllably moving said slide with respect to said body, said adjustable sliding means includes a first threaded opening in the partial end wall of said body and a second threaded opening in the guide of said slide, said first and second threaded openings being aligned, said adjustable sliding means further including a threaded rod for threading into each of said first and second threaded openings, wherein turning of said threaded rod causes said slide to move controllably one of toward and away from said partial end wall of said body; and

means, between the bottom of said channel and said first end of said body, for applying by each of said first and second side walls of said channel a compressive force against said guide.

4,710,074

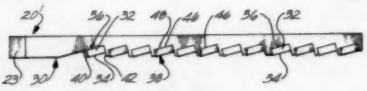
CASING MILL

Johann B. Springer, Aberdeen, Scotland, assignor to Smith International, Inc., Newport Beach, Calif.

Filed Dec. 4, 1985, Ser. No. 804,807

Int. Cl.[4] B23B *51/06;* **E21B** *10/00*

U.S. Cl. 408—200 **16 Claims**



1. In a casing mill of the type having a cylindrical body to be received into a well bore casing and having means at one end to attach the mill to a drill string for rotation therewith and means at the other end for piloting the mill in the casing, the improvement comprising:

a plurality of blades projecting outwardly from the body, each blade having a forward surface including a stair-step configuration having treads arranged at an angle between 10 and 20 degrees with respect to an axial plane, and orthogonal risers;

a plurality of polygonal cutting elements secured in a tesselating arrangement on each of said blade forward surfaces each of said elements having a back face secured to the treads on the forward surface and a front face to engage and mill the casing, so that said front faces are arranged to tilt in the direction of mill rotation to make, with respect to an axial plane, an angle of between 10 and 20 degrees.

4,710,075

ADJUSTABLE DRILL GAUGE

Dale Davison, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Oct. 1, 1986, Ser. No. 914,079

Int. Cl.[4] B23B *51/00*

U.S. Cl. 408—202 **10 Claims**

1. A drill stop apparatus for use with an elongated drill bit having a drilling end used to drill a hole of a specified, predetermined depth, the drill bit having a plurality of circumferentially extending, axially spaced grooves formed thereon, the stop comprising,

a body member having a first end and formed to include an axially extending bore sized to receive said drill bit to permit said drill bit to be moved axially within said body member,

said body member also formed to include a cavity that extends substantially perpendicular through said bore, and

a plunger disposed in said cavity for releasably engaging one of said plurality of grooves in said drill bit to lock said drill bit against axial movement within said body member such that a specified length of said drill bit extends beyond said first end of said body member to define a specified operable drilling length of said drill bit between said first end

and said drilling end, said plunger formed to include a transverse opening therethrough sized to receive said drill bit, said transverse opening including a ridge formed therein configured to engage selectively any one of said grooves in said drill bit to lock said drill bit against axial movement within said body member when said plunger is in a groove-engaging position, wherein a portion of said plunger extends beyond the outer surface of said body member, said extending portion adapted to be depressed by a force applied along an axis substantially perpendicular to the axis defined by said body member bore to move said plunger into a groove-disengaged position and spring means for yieldably urging said plunger into said groove-engaging position.

4,710,076

METHOD FOR CUTTING COMPLEX TOOTH PROFILES IN A CYLINDRICAL, SINGLE-SCREW GATE-ROTOR

Wayne W. Boblitt, Glen Burnie, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 13, 1985, Ser. No. 775,981

Int. Cl.[4] B23F *9/10*

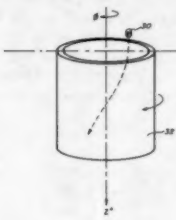
U.S. Cl. 409—26 **4 Claims**

1. A method for cutting a complex tooth profile in a cylindrical gate-rotor blank, comprising the steps of:

rotating the cylindrical gate-rotor blank about its center axis;

engaging the cylindrical gate-rotor blank with a cutting element having a longitudinal axis perpendicular to said center axis translating the cutting element along a non-circular path in a fixed two-axis plane while cutting the blank, that plane being parallel to the plane defined by the centerline of the cylindrical blank and a line extending radially therefrom, while keeping the cutting element normal to the two-axis plane throughout the cutting operation, said translating step including maintaining the cutter in said plane while moving the cutter simultaneously

along lines parallel and perpendicular to said blank centerline to form said path and



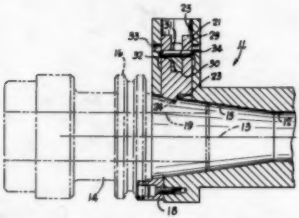
repeating the cutting operation to form a plurality of tooth profiles.

4,710,077

LOCKING TOOL HOLDER

Valdas S. Ramunas, Euclid, Ohio, assignor to Erickson Tool Company, Solon, Ohio

Filed Aug. 5, 1985, Ser. No. 762,255
Int. Cl.[4] B23C 5/26
U.S. Cl. 409—232 **13 Claims**



1. A locking tool holder for a rotatable spindle having a socket adapted to receive a tool having a lateral recess therein; said locking tool holder comprising in combination:

a first aperture in the rotatable spindle tool socket extending transversely to the axis of the tool socket;

a lock pin movable in said first aperture;

said lock pin adapted to wedgingly cooperate with and be lockably complementary to the lateral recess on a tool in the tool socket;

a second aperture in said tool socket intersecting said first aperture transversely thereto;

a cam bar slidable in said second aperture;

first and second cam surfaces on said cam bar cooperable respectively with first and second cam follower surfaces carried on said lock pin;

said cam bar being movable in opposite directions in said second aperture into first and second positions;

movement of said cam bar to said first position acting through said second cam and follower surfaces and establishing said lock pin in wedging engagement with the lateral recess on a tool to lock the tool in the tool socket, and movement of said cam bar towards said second position causing said first cam surface to act on said first cam follower surface to force said lock pin transversely outwardly to unlock a tool in the tool socket;

first retention means including said first and second cam surfaces on said cam bar to wedgingly retain said lock pin in said first aperture;

second retention means to retain said cam bar in said second aperture; and

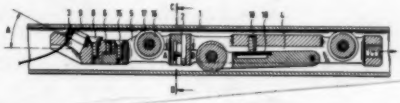
said second retention means including said first and second cam follower surfaces on said lock pin.

4,710,078

DEVICE FOR THE INTERNAL DEBURRING OF A PIPE

Werner Altmeyer, Völklingen; Ewald Jakobs, Bous, and Friedrich Meier, Remscheid, all of Fed. Rep. of Germany, assignors to TechnoARBED Deutschland GmbH, Saarbrucken-Burbach, Fed. Rep. of Germany

Filed Dec. 26, 1984, Ser. No. 686,196
Claims priority, application Fed. Rep. of Germany, Dec. 27, 1983, 3347146
Int. Cl.[4] B23D 1/08
U.S. Cl. 409—233 **3 Claims**



1. Device for the internal deburring of an axially elongated pipe or shaped tubular member having an axially extending welded seam with a portion of the welded seam projecting into the interior of the pipe or tubular member whereby the device removes the inwardly projecting portion of the welded seam in the cutting direction extending in the axial direction of the pipe or tubular member, the device includes a support body elongated in the cutting direction and arranged to be positioned in the pipe or tubular section, said support body having a first end and a second end spaced apart in the cutting direction, a cutting ring mounted on said support body adjacent the first end thereof, said cutting ring having an axis extending trasversely of the cutting direction, wherein the improvement comprises that said cutting ring on said support body is movably displaceable relative to the interior of the pipe or tubular member being deburred in the dirction extending transversely of the cutting direction during the deburring operation, said cutting edge has a cutting edge surface at one end thereof extending transversely of the axis thereof and an opposite end surface spaced from the cutting edge surface and extending transversely of the axis, an interior surface within said cutting ring extending between said cutting edge surface and said opposite end surface, said interior surface comprising a first cylindrical section extending from said cutting edge surface toward said opposite end surface, a second cylindrical section locataed at the opposite end surface and spaced axially from said first cylindrical section, a frusto-conical section extending between said first and second cylindrical sections with said frusto-conical section diverging outwardly from said first section toward said second section and then diverging inwardly to said second cylindrical section.

4,710,079

QUICK CHANGE SPINDLE ADAPTER FOR TOOL HOLDER

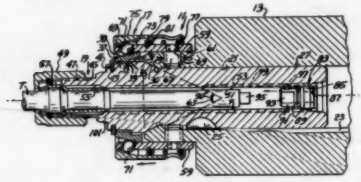
D. Frederick Smith, Rochester, and James E. Goodsmith, Utica, both of Mich., assignors to T. M. Smith Tool International Corp., Mount Clemens, Mich.

Continuation of Ser. No. 743,365, Jun. 11, 1985, abandoned. This application Dec. 29, 1986, Ser. No. 943,825
Int. Cl.[4] B23C 5/26
U.S. Cl. 409—234 **3 Claims**

1. In a spindle, adapter and tool holder assembly including a power rotated spindle having a bore and a forward end adapted to receive a tool holder, a cylindrical body having a uniform axial bore mounted upon and secured to said spindle and projecting forwardly thereof, a retractable spring biased sleeve movably mounted on the body and including a tapered inner wall, a tool holder mounting a tool projected into said body having a shank at its inner end slidably positioned in the spindle bore and keyed to said spindle and a tapered collar on said tool holder intermediate its ends projecting into said body, there being a series of spaced balls movably nested in and

around said body, portions of said balls projecting radially inward retainingly engaging said collar and projected radially outward in cooperative engagement with said tapered inner wall, the tapered sleeve inner wall converging relative to the collar providing a cooperative wedging action of the balls between the collar and sleeve inner wall for anchoring the tool holder within said body and against the end of said spindle whereby manual retraction of said sleeve releases said balls facilitating assembly into and manual removal of said tool holder from said body and spindle;

the improvement comprising



a conical recess within the inner bore surface at the forward end of said spindle defining an axial bearing;

and a centering cone upon and around said tool holder adjacent and forwardly of said shank in snug axial registry with said bearing maintaining an axial self-alignment of said tool holder and spindle; said sleeve inner wall and said collar having surfaces tapered rearwardly and outwardly so that said sleeve and balls exert an inward axial thrust upon said tool holder and shank biasing said centering cone against and into said conical spindle bearing.

4,710,080

CLAMPING APPARATUS FOR MAKING AN IMPROVED ELECTRICAL CONNECTION

Howard H. Sheppard, 7430 Sprague St., Philadelphia, Pa. 19119

Division of Ser. No. 417,240, Sep. 13, 1982, Pat. No. 4,482,782. This application Aug. 24, 1984, Ser. No. 644,304

Int. Cl.[4] F16B *39/02;* **H01R** *4/02*

U.S. Cl. 411—82 **5 Claims**

1. Clamping apparatus for use in making an improved soldered electrical connection between a wire and a terminal, comprising:

a ring shaped structure;

said ring shaped structure being comprised of a metallic material of a composition sufficiently malleable to be radially inwardly and plastically compressable over a terminal and a wire and of a sufficient rigidity to retain the deformed shape as compressed such that it is adapted to hold a wire tightly against a terminal;

said ring shaped structure being comprised of a member, said ring shaped structure having an outside and an inside diameter and a thickness measured perpendicular to said diameters, said ring member having a width dimension measured as the difference between an outside radius and an inside radius in the direction of the diameter, both of said diameters being large relative to said thickness and the thickness of the ring member measured perpendicular to a diameter being equal to or less than said width dimension;

said ring shaped structure being adapted to be applied over a terminal and a wire by a tool having a pair of mating jaws with slots therein, said width of said ring member being selected to be substantially equal to the depth of the slot in each of said mating jaws;

said ring shaped structure being provided with a radial slit or division at one location providing for a first and second free end wherein said first and second free ends of said ring shaped structure are offset in the direction perpendicular to said diameters one from the other to increase the ease of the free ends sliding past each other upon compression of the ring shaped structure over a terminal and a wire; and

said metallic ring shaped structure being provided with a layer of tinning material to enable the soldering of said ring, wire and terminal together as a unit.

4,710,081

SELF-LOCKING RESILIENT OR NON-RESILIENT ELEMENT

Egon Overhues, Neuenrade, Fed. Rep. of Germany, assignor to Vossloh-Werke GmbH, Werdohl, Fed. Rep. of Germany

Filed May 15, 1986, Ser. No. 863,442

Claims priority, application Fed. Rep. of Germany, May 31, 1985, 3519610

Int. Cl.[4] F16B *39/24*

U.S. Cl. 411—161 **6 Claims**

1. A self-locking resilient or non-resilient element, such as a spring-ring or a washer, comprising: first and second major surfaces having an inner and an outer boundary; wall-like protrusions arranged on each major surface and extending from the inner to the outer boundary; and recesses lying between said protrusions, wherein said protrusions have plateau-like upper surfaces which are concavely curved as viewed in cross-sections along the circumferential direction of the element to form scraping edges at sides of said upper surfaces, and wherein the wall-like protrusions extend generally radially in zig-zag fashion from the inner boundary to the outer boundary of each major surface, and the recesses lying between said protrusions are formed as zig-zag-shaped continuous channels which are open in the region of the inner and outer boundaries.

4,710,082

SEALED AND SECURED FASTENER

Gerald J. Curtis, 8806 Glen Loch Dr., Houston, Tex. 77017

Filed Jun. 18, 1986, Ser. No. 876,375

Int. Cl.[4] F16B *41/00*

U.S. Cl. 411—373 **10 Claims**

1. An apparatus for sealably securing a bolt, comprising:

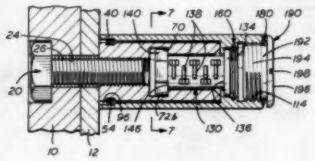
a nut member for mating with and securing the bolt,

said nut member having a nut body with an exterior surface of the same general shape from the nut head at one end of the nut base at the other end, said nut body having a circumferential groove adjacent said nut head adapted for an O-ring,

said nut body having a threaded bore extending from said nut head to an anchoring bore, and a receiving bore and a pair of longitudinal grooves cut into the interior wall of said nut body extending from said anchoring bore to said nut base providing a securing end and a locking end of said nut member;

a housing with an exterior surface which extends from the housing head to the housing base for substantially surrounding said nut member,

said housing having a nut receiving bore which has an inner diameter greater than the outer diameter of said nut member and extends to an inwardly projecting nut landing shoulder, such that when said shoulder contacts said nut base both said nut head and said housing head are flush



with an adjacent surface, and gland bore which extends from said housing head to said nut receiving bore;

locking means, disposed within said housing, for locking said housing to said nut member wherein said housing can move without imparting sufficient torque to said nut member to rotate said nut member; and

sealing means for sealing said nut member within said housing.

4,710,083

NAILING PLATE FOR THE PRODUCTION OF COMPOUND SUPPORTS, AND COMPOUND SUPPORT

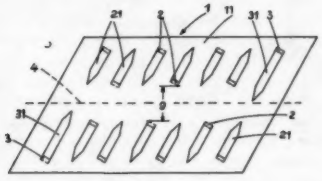
Johann Wolf, Scharnstein, Austria, assignor to Johann Wolf Gesellschaft m.b.H. KG, Scharnstein, Austria

Filed Sep. 24, 1985, Ser. No. 779,989

Claims priority, application Austria, Oct. 29, 1984, 3428/84; Oct. 29, 1984, 3429/84; Nov. 15, 1984, 3624/84; Nov. 15, 1984, 3625/84; Jul. 3, 1985, 1977/85; Jul. 8, 1985, 2021/85

Int. Cl.[4] F16B *15/00*

U.S. Cl. 411—466 **2 Claims**



1. In a nailing plate comprising a sheet-metal plate having a first parallel pair of edges and a second parallel pair of edges interconnecting said first parallel pair of edges, a plurality of nails extending from said sheet-metal plate, said plurality of nails being formed from parallel tongue-shaped perforations effected in said sheet-metal plate, said sheet-metal plate further comprising a central imperforate zone extending along an axis parallel to said first parallel pair of edges, all said parallel tongue-shaped perforations being inclined relative to said axis and evenly distributed on opposite sides of said imperforate zone; the improvement in which said second parallel pair of edges of said sheet-metal plate is inclined relative to said first parallel pair of edges, and all said parallel tongue-shaped perforations are parallel to said second parallel pair of edges of said sheet-metal plate.

4,710,084

APPARATUS FOR THE APPLICATION OF A STRIP ALONG THE SIDE EDGES OF A SHEET

Poul F. B. Ludvigsen, Tommerup, Denmark, assignor to Brdr. Ludvigsen, Tommfrup APS, Tommerup, Denmark

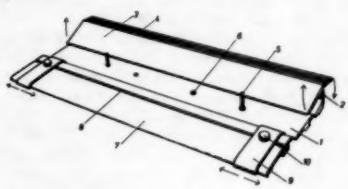
PCT No. PCT/DK85/00126, § 371 Date Aug. 22, 1986, § 102(e) Date Aug. 22, 1986, PCT Pub. No. WO86/04026, PCT Pub. Date Jul. 17, 1986

PCT Filed Dec. 20, 1985, Ser. No. 902,448

Claims priority, application Denmark, Jan. 7, 1985, 75/85

Int. Cl.[4] B42B *9/00*

U.S. Cl. 412—9 **1 Claim**



1. An apparatus for application of a strip along a side edge of a piece of sheet-formed material, the strip having adhesive and non-adhesive areas and at least one opening used in filing of the sheet-formed material, said apparatus comprising:

a bottom portion having at least one hole, one end of said bottom portion having a hinge, a clamping plate secured to said hinge, at least one pin protruding substantially upwardly from the hole of the bottom portion, a support part connected to said bottom portion, said support part having side-guides secured thereto for guiding the piece of sheet-formed material, said guides being movable transversely in the direction of insertion of the piece of sheet-formed material, and wherein there are several holes provided within said bottom portion for securing of said pin.

4,710,085

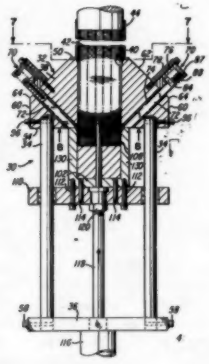
LAMINATION STACK SELECTION METHOD AND APPARATUS

John M. Beakes, Fairborn, and Hyman B. Finegold, Dayton, both of Ohio, assignors to Statomat-Globe, Inc., Dayton, Ohio

Filed Feb. 20, 1986, Ser. No. 831,646

Int. Cl.[4] B65G *59/06*

U.S. Cl. 414—27 **27 Claims**



1. Apparatus for supporting a vertical column of laminations in a chute and selecting a stack of laminations having a predetermined height from the bottom if said column, comprising:

a plurality of support pins each having a column-supporting, portion;

means mounting each of said support pins adjacent the lower end of said column for movement between a first, column-supporting position wherein said column-supporting portions of at least most of said support pins extend beneath and engage the bottom margin of said column to a second, column-releasing position wherein all of said column-supporting portions are out of engagement with said bottom margin;

lamination receptacle means for receiving and supporting a stack of laminations, said lamination receptacle means having an upwardly facing lamination-support surface upon which laminations may be stacked;

means for moving said lamination receptacle means into and away from a lamination stack-receiving position wherein said lamination-support surface is aligned with said column and spaced from the bottom of said column by substantially said predetermined height;

support pin positioning means moving said support pins out of supporting engagement with said column as said lamination receptacle means is moved into said lamination stack-receiving position so that, when said lamination receptacle means is moved into said lamination stack-receiving position, said column lowers until its bottom face engages and is thereby supported by said lamination-support surface; and

means returning said support pins to their respective said first, column-supporting positions as said lamination receptacle means begins to move away from said lamination stack-receiving position so that said support pins engage beneath the bottom of that portion of said column that remains in said chute.

4,710,086

BALE ACCUMULATOR

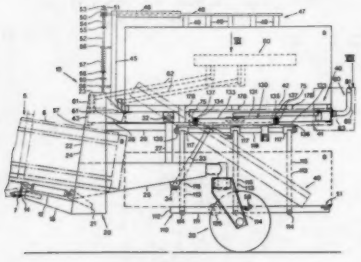
Adrianus Naaktgeboren, Zedelgem, and Roger H. Van Eecke, Blankenberge, both of Belgium, assignors to New Holland Inc., New Holland, Pa.

Filed Feb. 26, 1986, Ser. No. 834,098

Claims priority, application European Pat. Off., Feb. 27, 1985, 85.200.268

Int. Cl.[4] A01D *87/12*

U.S. Cl. 414—44 **13 Claims**



1. In a bale accumulator for use in conjunction with a baler from which, during operation, bales successively are discharged, the bale accumulator including a bale receiving table movable between a home position for receiving a bale from the baler and a bale transfer position, a loadbed disposed to receive bales from the bale receiving table and to accumulate a plurality of bales thereon, positioning means for moving the bale receiving table between its home position and its bale transfer position, the bale receiving table being disposed at least partially vertically underneath the loadbed when in its home position, the position means being operable to move the bale receiving table from its home position underneath the loadbed to its bale transfer position generally alongside and at the level of the loadbed, wherein the improvement comprises:

the bale receiving table being pivotally mounted on a shuttle mechanism which itself is movable along a transfer linear path between retracted and extended positions; the shuttle mechanism assuming its retracted position and the bale receiving table assuming a lower position when the bale receiving table is located in its home position, and

the positioning means, when moving the bale receiving table to the bale transfer position, being operable to simultaneously pivot the bale receiving table upwardly around its pivotal mounting on the shuttle mechanism and to translate the shuttle mechanism with the bale receiving table thereon from its retracted position to its extended position; so that the bale receiving table is moved through a composite path of elongated curved shape.

4,710,087

BALE ACCUMULATOR AND DISCHARGER

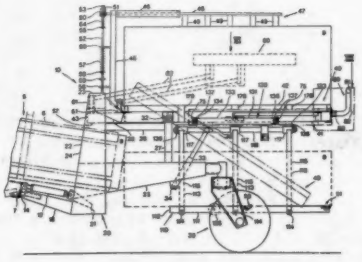
Adrianus Naaktgeboren, Zedelgem, and Roger H. Van Eecke, Blankenberge, both of Belgium, assignors to New Holland Inc.

Filed Feb. 26, 1986, Ser. No. 834,099

Claims priority, application European Pat. Off., Feb. 27, 1985, 85.200.269.0

Int. Cl.[4] A01D *87/12*

U.S. Cl. 414—44 **11 Claims**



1. In a bale accumulator for use in conjunction with a baler from which, during operation, bales successively are discharged, said bale accumulator including a bale receiving table movable between a home position for receiving a bale from the baler and a bale transfer position, a loadbed movable between a home position for accumulating a plurality of bales thereon transferred thereto from the bale receiving table and a bale dumping position for discharging accumulated bales onto the ground, first positioning means for moving the bale receiving table between its home position and its bale transfer position, second positioning means for moving the loadbed between its home position and its bale dumping position, and the bale receiving table being mounted on the loadbed in a manner for movement in unison therewith as the loadbed is moved between its home position and its bale dumping position, wherein the improvement comprises:

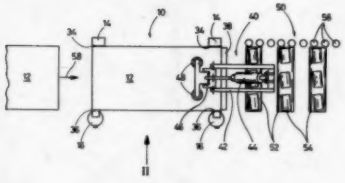
the bale receiving table being pivotally mounted on the loadbed, and, when in its home position, having a generally horizontal bale receiving surface disposed at a level below the level of the loadbed and the base receiving table also having generally upright bale support means arranged so that, as the bale receiving table is moved from its home position to its bale transfer position, the bale support means becomes operative to support a bale held on the bale receiving table, and assumes a position generally aligned with the surface of the loadbed for, in effect, becoming part of said surface to enlarge the bale holding capacity thereof.

4,710,088

MAGAZINE FOR STACKING SHEET-METAL MEMBERS

Felix Kramer, Friedlisberg, Switzerland, assignor to Elpatronic AG, Switzerland

Filed Oct. 28, 1986, Ser. No. 924,066
Claims priority, application Switzerland, Nov. 1, 1985, 4709/85
Int. Cl.[4] B65H 1/04
U.S. Cl. 414—113 2 Claims



1. A magazine used with the production of cans for stacking sheet-metal members, comprising:

a plurality of columns on which mutually remote edges of the sheet-metal members are guided; and

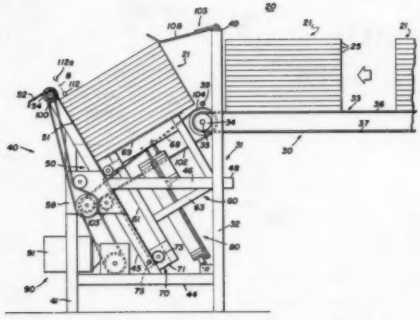
a resiliently flexible strip for at least one of said columns for exerting pressure on the associated edges of the sheet-metal members stacked between a first one of said columns and an opposite rigid column, said strip divided into a plurality of resiliently supported pressure members disposed one below the other, and having surfaces (32) deviating from a horizontal plane at their adjoining ends.

4,710,089

ARTICLE UNSTACKING SYSTEM

Thomas C. Schneider, Oak Forest, Ill., assignor to Velten & Pulver, Inc., Chicago Ridge, Ill.

Filed May 29, 1986, Ser. No. 868,026
Int. Cl.[4] B65G 59/02, 59/08
U.S. Cl. 414—118 19 Claims



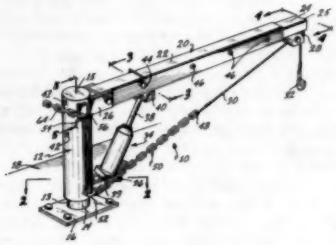
1. Apparatus for removing articles one at a time from the top of a stack of articles having an axis intersecting the top and bottom articles in the stack at the centers thereof, said apparatus comprising: stack support means for receiving the stack thereon, said support means including carriage means movable with respect to the remainder of said support means for effecting reciprocating movement of the stack in directions parallel to its axis; drive means coupled to said carriage means for effecting movement thereof and of the stack thereon between a discharge condition wherein the top article in the stack is disposed in a discharge position and a withdrawn condition below said discharge condition; discharge means engageable with the top article in the stack when it is disposed in its discharge position for removing it from the stack and moving it from its discharge position; and control means coupled to said drive means for controlling the operating thereof, of, said control means being responsive to movement of the top article to its discharge position for causing movement of the carriage means to its withdrawn condition while said discharge means is moving the top article from its discharge position to facilitate separation of the top article from the stack, said control means being responsive to removal of the top article from its discharge position and from the stack when said carriage means is in its withdrawn condition for causing movement of the carriage means back to its discharge condition.

4,710,090

HYDRAULIC HOIST PARTICULARLY FOR MOUNTING ON PICK-UP TRUCK BEDS OR THE LIKE

Charles Q. DeLuca, 33-1 8th Floor, Sunny Building An-ho Road, Taipei, and Huang J. Shiung, No. 227, Sec. 2 Po Ai Rd., Chiayi, both of Taiwan

Filed May 22, 1986, Ser. No. 866,125
Int. Cl.[4] B65G 67/02
U.S. Cl. 414—550 6 Claims



1. A hoist comprising:

an upright bearing post having a base at its lower end for mounting to an underlying structure such as the bed of a cargo vehicle;

a tubular support column rotatably coaxially supported on said upright post and having an upper end and a lower end;

a boom hingedly connected at one end to the upper end of said column such that the opposite free end of the boom can be raised or lowered;

drive means connected between said column and said boom operative for raising or lowering the free end of said boom;

a sheave carried at the free end of the boom;

a hoist cable looped over said sheave;

an eye affixed to said column near said lower end;

a chain threaded through said eye and secured at one end to said hoist cable; and

chain anchor means affixed to said column near its upper end and slotted for edgewise admitting any selected single link of said chain into said slot but blocking passage of the next upwardly adjacent transversely oriented link through said slot thereby to anchor said chain to said column against the pull of a load suspended from said hoist cable, whereby the effective length of said chain can be conveniently adjusted by selecting the link inserted into the slot;

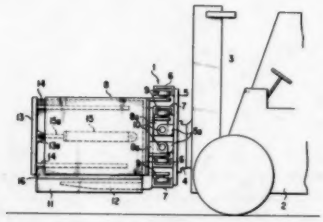
said eye acting to apply the lateral load component transmitted through said chain and cable to said column at a point near the base of said post so as to minimize the leverage effect on said base.

4,710,091

LOADING AND UNLOADING APPARATUS

Toshio Ochiai, Tokyo; Akio Tsujimura, Kawasaki, and Hiroshi Tsukiyasu, Yuki, all of Japan, assignors to Toyo Seikan Kaisha, Ltd. and Komatsu Forklift Kabushiki Kaisha, both of Tokyo, Japan

Filed Nov. 15, 1985, Ser. No. 798,273
Claims priority, application Japan, Nov. 16, 1984, 59-240497
Int. Cl.[4] B60P *1/00*
U.S. Cl. 414—623 1 Claim



1. A loading and unloading apparatus for moving stacked sheets comprising a movable vehicle, a vertically movable main body mounted on the front of said vehicle, said main body including a fork extending forward from the front of said vehicle for positioning under and for lifting said stacked sheets, a plurality of horizontal guide rails spaced vertically and fixedly mounted on said maind body adjacent the front of said vehicle, a pair of arms at the opposite ends of said guide rails and slidably supported at their base ends via telescope means within said guide rails and extending forward from the front of said vehicle substantially parallel to said fork, a first drive means coupled to each arm of said pair of arms and to said main body for selectively moving each said arm closer to and away from the ther said arm, said first drive means including a hydraulic cylinder coupled at one of its ends to the base end of said arm and at the other of its ends to said main body, each arm of said pair of arms being formed in a flat box shape extending vertically of and forwardly from the front of said vehicle, front stopper means at the front forward end of each said arm of said pair of arms, each said front stopper means extending inwardly from the front forward end of one of said arms of said pair of arms toward the other of said pair of arms, each of said front stopper means having an upper and a lower guide rod extending into the front end of said one of said arms and a second drive means coupled to said front stopper means for moving said stopping means closer to and away from the front forward end of said arms, said second drive means having a hydraulic cylinder in said arm coupled at one of its ends to said arm and at the other end to said stopper means.

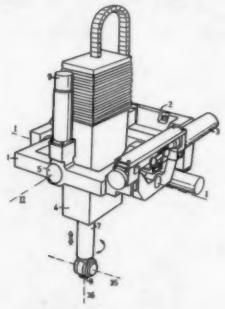
4,710,092

INDUSTRIAL ROBOT HAVING TWO GIMBAL-RING TYPE ARRANGED SWINGING AXES

Hans Skoog; Ulf Holmqvist, and Leif Telldén, all of Västerås, Sweden, assignors to ASEA AB, Västerås, Sweden

Filed May 10, 1985, Ser. No. 732,650
Claims priority, application Sweden, May 18, 1984, 8402693
Int. Cl.[4] B25J *11/00*
U.S. Cl. 414—729 3 Claims

1. An industrial robot comprising a gimbal-ring type suspended part, a first motor and a second motor for rotating the gimbal-ring type suspended part about two mutually perpendicular axes, a translatory movable arm having an axis and in the gimbal-ring type suspended part, a protruding end of the arm having an axially rotatable tool attachment, said arm being attached to a platform which is mounted on guides located within the gimbal-ring type suspended part, a third motor mounted on the gimbal-ring type suspended part, the third motor for providing translatory movement of the platform along the guides, and three additional motors mounted on said platform including a fourth motor whose shaft connects through a gear engagement with a gear which is rotatably mounted on the platform on the same axis as the arm, and a fifth motor and a sixth motor attached to said gear, the fifth and



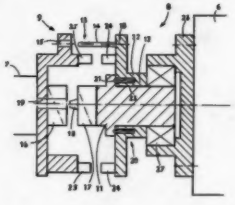
the sixth motors each connected to a respective shaft which extend to the tool attachment and which are adapted to rotate said tool attachment about a first tool axis extending at right angles to the arm and about a second tool axis which extends at right angles to the first tool axis.

4,710,093

DEVICE FOR THE AUTOMATIC GRIPPING AND RELEASING OF A TOOL HOLDER IN A MANIPULATOR

Ernst Zimmer, Friedberg, and Botho Kikut, Augsburg, both of Fed. Rep. of Germany, assignors to KUKA Schweissanlagen & Roboter GmbH, Fed. Rep. of Germany

PCT No. PCT/EP85/00265, § 371 Date Feb. 7, 1986, § 102(e) Date Feb. 7, 1986, PCT Pub. No. WO86/00040, PCT Pub. Date Jan. 3, 1986
PCT Filed Jun. 4, 1985, Ser. No. 832,712
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1984, 3421452
Int. Cl.[4] B25J *11/00*
U.S. Cl. 414—730 16 Claims



1. A coupling arrangement for the automatic gripping and releasing of a tool for use with a last drive member of a multi-axial manipulator, the last drive member having an axis of rotation, the coupling arrangement comprising: a first coupling part,operatively connected to the last drive member, having a first operating element and a second operating element, each of the first and second operating elements having an axis of rotation coincident with the axis of rotation of the last drive member, said first operating element being concentrically mounted on said second operating element; a second coupling part, connected to the tool, a rotational connector, having a first rotational connector part associated with said second operating element and a second rotational connector part connected with said second coupling part; rotational barrier means, associated with said first operating element and engageable with

said second coupling part, for preventing relative rotation between said first operating element and said second coupling part; clutch means for fixing said first operating element relative to said second operating element and for releasing said first operating element relative to said second operating element when said rotational barrier means acts to prevent said first operating element from rotating relative to said second coupling part, thereby allowing said first rotational connector part to rotate, upon rotation of the last drive member and said second operating element, to allow engagement of said first and second rotational connector part, while said rotation barrier means prevents relative rotation between said first operating element and said second coupling part and said drive member acts as energy source to rotate together the two coupling parts.

4,710,094

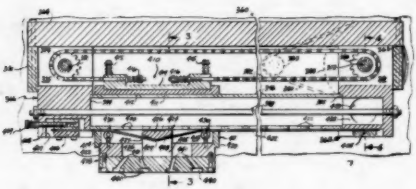
AUTOMATIC CONTINUOUSLY CYCLEABLE MOLDING SYSTEM AND METHOD

Richardus H. J. Fierkens, Herwen, and Ireneus J. T. M. Pas, Rozendaal, both of Netherlands, assignors to ASM Fico Tooling, b.v., Herwen, Netherlands

Division of Ser. No. 586,855, Mar. 6, 1984, Pat. No. 4,575,328. This application Nov. 15, 1985, Ser. No. 798,679

Int. Cl.⁴ B65G *25/00*

U.S. Cl. 414—752 **2 Claims**



1. A conveyor mechanism for transporting workpieces comprising; in combination:

(a) an elongated tube means for providing a bore and a plurality of ports passing therethrough;

(b) said plurality of ports of said elongated tube means being formed in longitudinally spaced increments along the length thereof;

(c) an elongated band means in coextensive contiguous engagement with said tube means for closing said plurality of ports;

(d) said band means being suitable for being deflectable out of port closing engagement with said tube means;

(e) a carriage means mounted on said tube for defining a chamber which encloses a portion of said tube means and a portion of said band means;

(f) a means coupled to said carriage means for reciprocal movement thereof along the length of said tube means;

(g) a holding means mounted in said chamber of said carriage means for engaging said band means at spaced apart locations;

(h) deflecting means mounted in said chamber of said carriage means for engagement with said band means;

(i) said deflecting means being operably engaged with said band means at a portion which is between the spaced apart locations where said holding means engages said band means to deflect a portion of said band means out of port closing engagement with said tube means to place said bore of said tube means in communication with said chamber of said carriage means;

(j) a pick-up head means for being carried on said carriage means and being in fluid communication with said chamber; and

(k) a means coupled to said tube for selectively producing a negative static pressure therein.

4,710,095

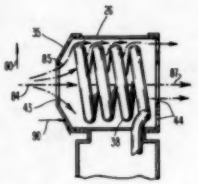
TURBOMACHINE AIRFLOW TEMPERATURE SENSOR

Dana D. Freberg, Middletown, and William R. Spencer, Springdale, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 404,942, Aug. 4, 1982, abandoned. This application Mar. 19, 1984, Ser. No. 589,866

Int. Cl.⁴ F01D *17/08*

U.S. Cl. 415—48 **1 Claim**



1. An apparatus for sensing the dry bulb temperature of a fluid stream having a gaseous phase and a liquid phase, comprising:

a hollow generally cylindrical member having a first radius;

a means for admitting a fluid stream having a gaseous phase and a liquid phase into the cylindrical member, comprising a generally circular opening in one end of the cylindrical member having a second radius smaller than the first radius, the opening being capable of admitting a fluid stream into the cylindrical member along the longitudinal axis of the member such that the fluid stream is accelerated away from the axis, the acceleration of the gaseous phase being greater than that of the liquid phase; and

a means for sensing the dry bulb temperature of the fluid stream admitted into the hollow member, comprising a temperature sensor located inside the cylindrical member a distance away from the axis between the first and second radii, the path between the axis and the temperature sensor being unobstructed along substantially the entire length of the axis inside the cylindrical member.

4,710,096

FAN MOUNTING

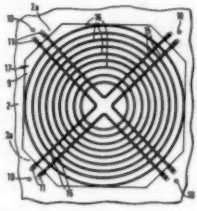
David P. Erlam, Winchester, England, assignor to Rittal-Werk Rudolf Loh GmbH & Co KG, Fed. Rep. of Germany

Filed Jan. 14, 1986, Ser. No. 818,776

Claims priority, application United Kingdom, Jan. 23, 1985, 8501657

Int. Cl.⁴ F04B *17/00*

U.S. Cl. 415—121 G **8 Claims**



1. A fan casing for mounting a plurality of motor/fan units and comprising an upper planar member, a lower planar member, motor/fan units sandwiched between said planar members and finger guard members to cover openings in the planar members, wherein inwardly directed projections are provided on the planar members to engage in apertures in the motor/fan units to locate the motor/fan units, indentations are formed in the planar members to receive and locate the finger guard

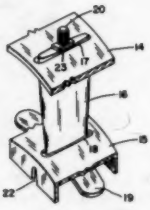
members so that when the casing is assembled the finger guard members are disposed between the motor/fan units and the planar members, the two planar members are substantially identical, and attachment means are provided to couple the two planar members one to the other.

4,710,097

STATOR ASSEMBLY FOR GAS TURBINE ENGINE

Aldo A. Tinti, Fairfield, Conn., assignor to Avco Corporation, Providence, R.I.

Filed May 27, 1986, Ser. No. 867,163
Int. Cl.[4] F04D *29/34*
U.S. Cl. 415—138 **14 Claims**



10. A vane assembly for a gas turbine engine comprising:
a vane having inner and outer ends;
a pad integral with the outer end of said vane;
a stud integral with and extending outwardly from said pad; and
a flexible compression plate integral with the inner end of said vane.

12. A method of assembling a stator assembly to the casing of a gas turbine engine comprising the steps of:
providing the stator assembly with a plurality of first vanes of a first vane type each of which is fixedly attached at opposing ends thereof to an outer and an inner shroud;
providing the stator assembly with radially opposed pairs of openings made through the inner and outer shrouds;
providing openings through the casing;
positioning the stator assembly within a groove formed on an interior wall of the casing such that the openings made through the outer shroud and the openings made through the casing are in registration one with the other;
sliding a second vane of a second vane type radially through each of the pairs of openings of the inner and outer shrouds, the second vane having a fastening means provided on an outer end, the second vane further having a compression means provided on an inner end for compressively engaging a bottom surface of the inner shroud; and
securing each of the second vanes to the casing with a securing means which tighteningly engages the fastening means through the corresponding opening within the casing such that the second vane is placed in tension whereby the compression means compressively engages the bottom surface of the inner shroud to clamp the stator assembly to the casing.

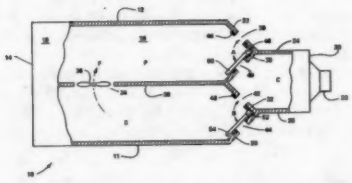
4,710,098

VALVE AND BLOWER APPARATUS FOR PNEUMATIC TUBE SYSTEM

Walter G. Anders, North Canton; Leo J. Grosswiller, Jr., East Canton; Benjamin F. Lozier, and Alan J. Rozlosnik, both of Louisville, all of Ohio, assignors to Diebold, Incorporated, Canton, Ohio

Filed Nov. 27, 1985, Ser. No. 802,796
Int. Cl.[4] B65G *51/08*; F04D *29/40*
U.S. Cl. 415—149 A **55 Claims**

30. Apparatus for selectively applying pressure or suction at an outlet port comprising:
a housing;
dividing means dividing said housing into compartments, said compartments including suction area and a pressure area;
suction producing means for producing suction in the suction area;
pressure producing means for producing pressure in the pressure area;
second air flow passage means for air flow between said suction area and atmosphere;
third air flow passage means for air flow between said suction area and said outlet port;
fourth air flow passage means for air flow between the pressure area and said outlet port;
fifth air flow passage means for air flow between the pressure area and atmosphere;
first air flow director means for directing air flow into said suction area, said first air flow director means having a



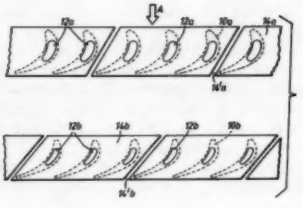
first condition opening said third air flow passage means while closing said second air flow passage means, and a second condition opening said second air flow passage means while closing said third air flow passage means;
second air flow director means for directing air flow out of said pressure area, said second air flow director means having a first condition opening said fifth air flow passage means while closing said fourth air flow passage means, and a second condition opening said fourth air flow passage means while closing said fifth air flow passage means; and
control means for controlling the conditions of said first and second air flow direction means, suction being applied at said outlet port when the first and second air flow director means are in their respective first conditions andpressure being applied at said outlet port when the first and second air flow director means are in their respective second conditions.

4,710,099

MULTI-STAGE TURBINE

Toshihiro Matsuura, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 803,348, Dec. 2, 1985, abandoned. This application Feb. 24, 1987, Ser. No. 18,733
Claims priority, application Japan, Nov. 30, 1984, 59-253265
Int. Cl.[4] F01D *9/04*
U.S. Cl. 415—199.5 **7 Claims**



1. A multistage turbine comprising:

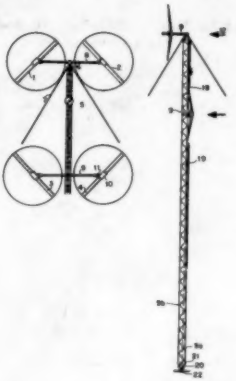
(a) a rotor disk having a cylindrical outer surface in which a plurality of dovetail-shaped grooves are formed;
(b) a casing surrounding said rotor disk;
(c) a plurality of dovetail-shaped anchoring portions, each one of said plurality of dovetail-shaped anchoring portions being slidably received in a corresponding one of said plurality of dovetail-shaped grooves;
(d) a first turbine stage comprising a plurality of axially aligned, circumferentially equally spaced first turbine blades, at least one of said first turbine blades being mounted on each one of said plurality of dovetail-shaped anchoring portions and projecting radially outwardly from said rotor disk;
(e) a second turbine stage located downstream of said first turbine stage and comprising a plurality of axially aligned, circumferentially equally spaced second turbine blades, at least one of said second turbine blades being mounted on each one of said plurality of dovetail-shaped anchoring portions and projecting radially outwardly from said rotor disk;
(f) a plurality of axially aligned, circumferentially equally spaced first nozzle plates mounted on said casing and projecting inwardly therefrom, said first nozzle plates being located upstream of and closely adjacent to said first turbine stage;
(g) a plurality of axially aligned, circumferentially equally spaced second nozzle plates mounted on said casing and projecting radially inwardly therefrom, said second nozzle plates being located between said first and second turbine stages and closely adjacent to said second turbine stage;
(h) a first circumferentially extending shroud surrounding said first turbine stage and connecting the radially outer ends of at least some of said first turbine blades, said first circumferentially extending shroud being divided by gaps at intervals in the circumferential direction; and
(i) a second circumferetially extending shroud surrounding said second turbine stage and connecting the radially outer ends of at least some of said second turbine blades, said second circumferentially extending shroud being divided by gaps at intervals in the circumferential direction and the gaps dividing portions of said second circumferentially extending shroud being offset in the circumferential direction from the gaps dividing portions of said first circumferentially extending shroud,
whereby, in use, the vibration level of said first and second turbine blades due to the eddies-containing wakeflow coming from the trailing edges of said first and second nozzle plates is greatly reduced.

4,710,100
WIND MACHINE

Oliver Laing, and Johannes L. N. Laing, both of 4461 Ocean Blvd., Apt. 54, San Diego, Calif. 92019

Filed May 17, 1984, Ser. No. 611,464
Claims priority, application Switzerland, Nov. 21, 1983, 6242/83
Int. Cl.[4] F03B *7/00*; B63H *5/08*
U.S. Cl. 416—11 **12 Claims**

1. A wind machine of the type having at least two rotor units, and a tower for supporting the rotor units and having a vertical axis, comprising:
(a) a foot bearing for rotatably supporting the tower at a bottom end;
(b) a stud rigidly fixed to said tower in a generally horizontal position for supporting a pair of said at least two rotor units in a position that the rotors rotate in a plane on the downwind side of the tower and are spaced horizontally;
(c) a second bearing on said tower positioned above the lowest point of rotation of said rotor and below said stud and providing attachment for guy wires to hold said tower in an upright position rotatable about a vertical axis; and

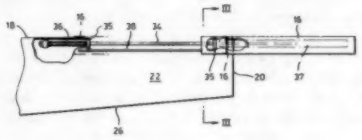


(d) each of said rotor units of said pair rotates in a direction opposite from the other.

4,710,101
WIND TURBINE

Peter M. Jamieson, Stirling, Scotland, assignor to James Howden & Company Limited, Glasgow, Scotland

Filed Apr. 25, 1986, Ser. No. 856,049
Claims priority, application European Pat. Off., Apr. 26, 1985, 85302983.3
Int. Cl.[4] F03D *7/04*
U.S. Cl. 416—32 **9 Claims**



1. A wind turbine comprising, in combination:
(a) a rotor;
(b) a plurality of circumferentially spaced blades on said rotor;
(c) an aerofoil cross-section to each of said blades;
(d) major upper and lower surfaces of said aerofoil cross-section;
(e) a leading edge and a trailing edge of said aerofoil cross-section;
(f) a tip of each said blade;
(g) a nose portion of the leading edge of each blade adjacent the blade tip, said nose portion having a shape conforming to a part of the leading edge of the aerofoil cross-section;
(h) guide means guiding said nose portion for movement longitudinally of the associated blade; and
(i) a remaining forwardly facing portion of each said blade, normally covered by said nose portion, said remaining forwardly facing portion having a different, high drag shape than said leading edge, said high drag shape being revealed only when said nose portion is moved longitudinally radially outwardly of the rotor axis to a displaced position.

4,710,102

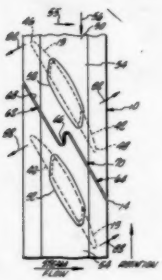
CONNECTED TURBINE SHROUDING

Ralph J. Ortolano, 3776 Coolheights Dr., Rancho Palos Verdes, Calif. 90274

Filed Nov. 5, 1984, Ser. No. 668,160

Int. Cl.[4] F01D *5/22*

U.S. Cl. 416—190 **9 Claims**



1. A rotor structure for an axial flow elastic fluid utilizing machine comprising:

(a) a rotor spindle;

(b) an annular row of radially extending blades carried by the rotor spindle; and

(c) a non-integral arcuate shroud ring structure, attached to the radially outermost tips of the blades for rigidly connecting the blades to each other in long arc groups comprising at least 12 blades, the shroud ring structure being divided into shroud segments with gaps therebetween, one shroud segment for each group, the long arc groups being of substantially equal central angular extend, the number of long arc groups being equal to the blade resonant frequency divided by an integer multiple of the rotor running speed; the blade tips being skewed relative to the direction of rotation of the shroud, the shroud segments having a leading end and a trailing end, at least one pair of adjacent segments having their adjoining ends configured to be flexibly interlocked to each other without connectors at a gap that is completely between blade tips, with the adjoining ends having a "Z" configuration comprising two end sections connected by a section substantially parallel to the direction of rotation of the shroud, the two end sections being transverse to the direction of rotation of the shroud, such that when the machine is in operation, the blades tend to untwist resulting in the gap closing in the middle section of the "Z" configuration.

4,710,103

METHOD FOR FASTENING BLADES ON THE PERIPHERY OF THE ROTOR BODY OF A STEAM TURBINE AND THE TURBO-MACHINE PRODUCED BY THE METHOD

Guy Faber, and Gottfried Kuhnen, both of Oberrohrdorf, Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jun. 11, 1986, Ser. No. 873,605

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1985, 3521664

Int. Cl.[4] F01D *5/30;* **B23P** *15/02;* **B21K** *23/00*

U.S. Cl. 416—219 R **18 Claims**

1. A rotor and blade arrangement for a steam turbine, comprising:

a rotor body;

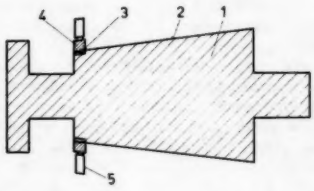
an outer layer applied to the rotor body comprising at least one welding run of a steel that is one of high temperature corrosion resistance and stress corrosion resistance;

said outer layer being machined for the purpose of receiving blades; and

blades inserted into the machined outer layer.

8. A method for fastening blades on the periphery of a rotor body of a steam turbine by firmly clamping and wedging the blades in recesses and/or protrusions of the rotor body, comprising:

covering an annular portion of the outer surface of the rotor body, by means of deposit welding, with at least one layer,



said at least one layer being formed by welding a run of one of a high temperature corrosion resistant and stress corrosion resistant steel,

after solidification of the welding run, subjecting the part of the rotor body formed by deposit welding to machining by one of turning, milling and grinding for the purpose of forming at least one of a recess and a protrusion to receive the blades, and

inserting the blades in said at least one machined layer of weld material.

4,710,104

VARIABLE DISPLACEMENT FLUID PUMP WITH TRANSDUCER INTERFACE

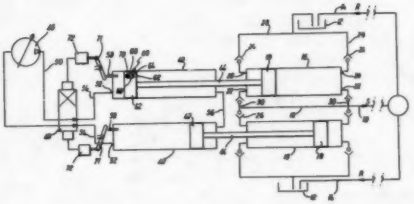
Eric Dring, Mansfield, United Kingdom, assignor to Dale (Mansfield) Limited, England

Continuation of Ser. No. 746,426, Jun. 19, 1985, abandoned. This application Nov. 17, 1986, Ser. No. 931,888

Claims priority, application United Kingdom, Jul. 10, 1984, 8417539

Int. Cl.[4] F04B *17/00, 35/00*

U.S. Cl. 417—53 **3 Claims**



3. A method of providing a variable supply of a water-based fluid at constant pressure to a hydraulic ring main in a mine to which hydraulically operated machines are connected comprising the steps of:

(a) actuating out-of-phase a pair of double acting piston and cylinder pumps interposed in said hydraulic ring main to maintain a constant pressure level in a first pressure fluid therein for hydraulically operating machines connected thereto;

(b) driving said double acting piston and cylinder pumps by use of a pair of out-of-phase piston and cylinder hydraulic motors, the piston of each of said motors being mechanically connected to the piston of a corresponding pump;

(c) supplying a second pressure fluid from a variable displacement pump to the cylinders of the motors in front of their pistons;

(d) permitting a flow of said first pressure fluid between the rear of the pistons of the motor; and

(e) controlling the flow of said second pressure fluid from the variable displacement pump to the motors by means of a spool valve to supply and exhaust the motor cylinders alternately.

4,710,105

LIQUID-RING COMPRESSOR UNIT

Udo Segebrecht, and Siegfried Auschrat, both of Heiligenstedten, Fed. Rep. of Germany, assignors to Sihi GmbH & Co. KG, Itzehoe, Fed. Rep. of Germany

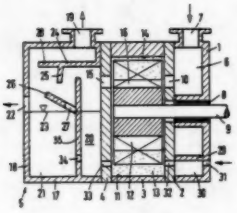
PCT No. PCT/EP85/00286, § 371 Date Feb. 13, 1986, § 102(e) Date Feb. 13, 1986, PCT Pub. No. WO86/00117, PCT Pub. Date Jan. 3, 1986

PCT Filed Jun. 10, 1985, Ser. No. 833,390

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1984, 3421866

Int. Cl.⁴ F04C *19/00*

U.S. Cl. 417—68 **6 Claims**



1. In a liquid ring compressor unit having an elongated horizontal housing including a gas inlet suction connection piece in communication with a suction intake chamber leading to at least one compressor stage, a shaft passing horizontally through the compressor stage, an outlet pressure connection piece in communication with a pressure opening in the last compressor stage, the last compressor stage including a working chamber having a vane rotor mounted on the shaft which cooperates with a working liquid ring to compress the gas and to form a fluid medium containing said gas and entrained working liquid, the fluid medium being discharged through said pressure opening into said pressure connection piece, wherein the improvement comprises:

the housing including a pressure chamber located longitudinally adjacent the last compressor stage, the pressure chamber having substantially the same height and width dimensions as the compressor stage;

the pressure opening being located in a geodetically upper portion of the compressor stage and extending horizontally into communication with the pressure chamber;

the pressure chamber including a vertical wall which projects upwardly at least to a position directly opposed to the pressure opening, the wall defining a first region between the wall and the compressor stage and a second region between the wall and one longitudinal end of the housing, the first and second regions being in fluid communication above the wall;

said pressure connection piece being in communication with a geodetically upper portion of said pressure chamber through a penetration in the housing;

a liquid overflow discharge port separate from the pressure connection piece, located in the second region and penetrating the housing;

baffle means positioned between the top of the wall and the pressure connection piece, for defining a baffled flow path within the second region between the wall and the pressure connection piece;

whereby the fluid medium emerging from the pressure opening strikes against the wall such that a large part of the liquid is separated in the first region and the medium then enters the baffled flow path where at least some of the liquid remaining in the medium is deposited on the baffle means before the medium is discharged through the pressure connection piece.

4,710,106

VOLUME CONTROLLING DEVICE FOR VARIABLE VOLUME PUMP

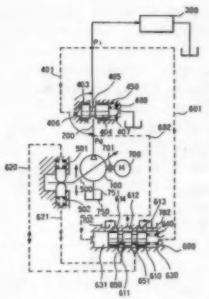
Hiroshi Iwata; Masatoshi Kuroyanagi, both of Kariya; Masahiko Suzuki, Hoi; Koichi Moriguchi, Nagoya; Yasuhiro Horiuchi, Hoi, and Kanehito Nakamura, Oubu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 25, 1985, Ser. No. 801,309

Claims priority, application Japan, Nov. 26, 1984, 59-249896; Nov. 5, 1985, 60-247687

Int. Cl.⁴ F04B *49/00, 1/06*

U.S. Cl. 417—213 **10 Claims**



1. A volume controlling pumping device comprising:

a pump for compressing and discharging working fluid;

variable choke, having an input connected to an output of said pump and having an outlet;

mechanical means for controlling said variable choke to adjust the fluid flow through said variable choke in direct response to fluid pressure at said outlet of said variable choke and substantially independently of fluid pressure at said input of said variable choke, whereby said variable choke means is controlled substantially independently of vibration of the discharge pressure of said pump; and

means for varying the capacity of said pump so as to maintain the fluid pressure difference on opposite sides of said variable choke means constant.

8. A volume controlling pumping device comprising:

a pump for compressing and discharging working fluid at an output;

a channel fluidly coupled to said output of said pump;

variable choke means disposed in said channel for varying the flow through cross-section of said channel, said variable choke means reducing the flow through cross-section of said channel when the pressure of the working fluid in said channel downstream of said variable choke increases, said variable choke means increasing the flow through cross-section of said channel when the pressure of the working fluid in said channel downstream of said variable choke decreases;

said variable choke means having a control piston reciprocating within said channel, a passing area being defined by said control piston for passing working fluid through said variable choke means, said passing area varying its area facing said channel in accordance with movement of said control piston so that the opening area of said channel is controlled in accordance with the movement of said control piston, a drain chamber, and a bypass passage connecting said drain chamber and said passing area;

variable capacity means for controlling the capacity of said

pump including a first drive piston and a second drive piston; and

pressure detecting means for detecting the pressure of working fluid in said channel downstream and upstream of said variable choke, means including:

a first pressure passage through which a control signal is introduced into said first drive piston,

a second pressure passage through which a control signal is introduced into said second drive piston,

an introducing pressure port through which pressure of working fluid in said channel between said pump and said variable choke is introduced into said pressure detecting means,

a drain port through which working fluid is drained from said pressure detecting means, and switching means selecting the connection of said first pressure passage, said second pressure passage, said introducing pressure port and said drain port from one of: (1) an increasing position wherein said first pressure passage is connected to said introducing pressure port and said second pressure passage is connected to said drain port for moving said first drive piston and said second drive piston so that the capacity of said pump is increased when said pressure detecting means detects the difference of the pressures of the working fluid in said channel downstream and upstream of said variable choke is smaller than a predetermined pressure, (2) a keeping position wherein said first pressure passage and said second pressure passage are shut off from said introducing pressure port and said drain port for keeping the position of said first drive piston and said second drive piston so that the capacity of said pump is maintained when said pressure detecting means detects the difference of the pressure of the working fluid in said channel downstream and upstream of said variable choke means is about said predetermined pressure, and (3) a reducing position wherein said first pressure passage is connected to said drain port and said second pressure passage is connected to said introducing pressure port for moving said first drive piston and said second drive piston so that the capacity of said pump is reduced when said pressure detecting means detects the difference of the pressure of the working fluid in said channel downstream and upstream of said variable choke is larger than said predetermined pressure.

4,710,107

SWASHBLOCK LUBRICATION IN AXIAL PISTON FLUID DISPLACEMENT DEVICES

Kerry R. Kanies, Hubertus, Wis., assignor to The Oilgear Company, Milwaukee, Wis.

Filed Apr. 15, 1986, Ser. No. 852,348

Int. Cl.[4] F04B *1/12, 27/03;* **F01M** *11/00*

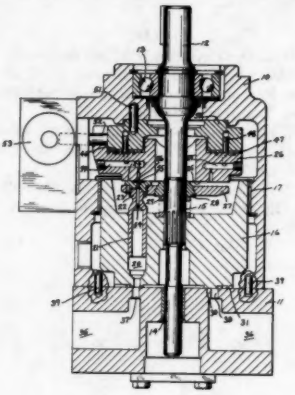
U.S. Cl. 417—269 **6 Claims**

1. In a variable displacement fluid device having a housing with a high pressure port and a low pressure port, a rotatable cylinder barrel journaled in the housing and including a plurality of cylinders each having a piston that pivotally mounts a shoe that slides over a front face of a swashblock, the pistons and shoes having cooperating passages that lead from the cylinder to the front face of the swashblock to provide fluid from the cylinders to lubricate the front face of the swashblock, the swashblock having a pair of rear arcuate bearing surfaces, a support in said housing for the swashblock bearing surfaces, a pair of arcuate bearings disposed against said support and engaged by the swashblock bearing surfaces, and means for pivoting the swashblock over the surface of the bearings to vary the angle of the front face of the swashblock, the improvement wherein:

the one swashblock bearing surface of said swashblock that is opposite the high pressure port is formed with a continuous groove that faces the respective bearing,

a passageway is formed internal of the swashblock and terminates in the groove, and

an opening including an orifice is provided in the swashblock leading to the passageway from a position on the front face of the swashblock that is axially aligned with said one bearing surface and in the path of the shoes,



whereby a small, controlled amount of fluid from the passages in the pistons and shoes will be pumped into the opening, through the orifice, and into the passageway to deposit fluid in the groove to lubricate said respective bearing.

4,710,108

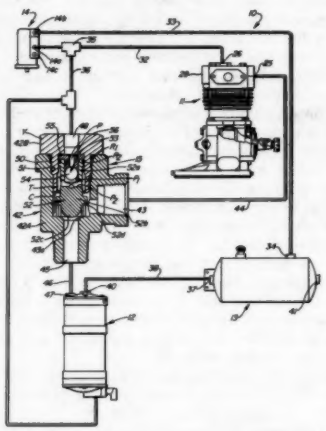
ISOLATION VALVE CONSTRUCTION

Thomas R. Soupal, Owosso, Mich., assignor to Midland Brake, Inc., Oswosso, Mich.

Filed Mar. 11, 1987, Ser. No. 24,624

Int. Cl.[4] F04B *49/00*

U.S. Cl. 417—298 **12 Claims**



1. An isolation valve for use in a pneumatic system having an air compressor adapted to operate in normal and unloading modes and having first and second ports, an air dryer having inlet and outlet ports, a reservoir of charged air having an inlet port and a signal outlet port, the reservoir inlet port being in communication with the dryer outlet port, and a governor having a first port in communication with the reservoir signal outlet port, a second port in communication with the compres-

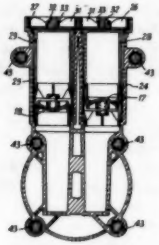
sor second port, and an exhaust third port, the governor being adapted to effect select communication between the ports thereof under preset conditions; said isolation valve comprising a housing provided with an internal cavity, a first port to the cavity adapted to communicate with the compressor first port, a second port to the cavity adapted to communicate with the dryer inlet port, a third port to the cavity adapted to communicate with the governor second port; a pneumatically responsive primary valve means mounted within said housing cavity for movement between open and closed positions relative to said housing second port, said primary valve means being provided with an internal passage having one end thereof in communication with the housing third port and second end in communication with said housing cavity; and a pneumatically responsive secondary valve means mounted within said passage for independent movement between passage blocking and unblocking positions, said secondary valve means being in said blocking position and said primary valve means being in said open position when the compressor is in the normal mode; said secondary valve means being in an unblocking position, and said primary valve means being in said closed position when the compressor is in an unloading mode and the first and second ports of the governor are in communication with one another.

4,710,109

DIAPHRAGM PUMPS WITH IMPROVED STRUCTURAL COOLING AND MAINTENANCE

Patrick J. M. Ballu, Reims, France, assignor to Tecnoma, France

Filed May 8, 1986, Ser. No. 861,235
Claims priority, application France, May 10, 1985, 85 07098
Int. Cl.[4] F04B *21/00*
U.S. Cl. 417—454 **18 Claims**



1. A diaphragm attachment screw for a diaphragm pump, characterized in that the head thereof has the form of a metal cup of large diameter with concavity facing opposite the threaded part and whereof the surface is provided with a plurality of annular reliefs insuring that the cup has a large surface relative to the volume which it occupies.

4,710,110

FLUID PUMP APPARATUS

Henry G. Paulus, 50 Bilodeau Ct., Burlington, Vt. 05401

Filed Sep. 22, 1986, Ser. No. 875,017
Int. Cl.[4] F04C *18/18*
U.S. Cl. 418—15 **9 Claims**

1. A compressor having a central cavity having walls, a fluid inlet means including an inlet cap and a fluid outlet means including an outlet cap coupled to the cavity, at least a pair of intermeshing impellers each having a hollow interior positioned in the cavity between the fluid inlet means and the fluid outlet means,

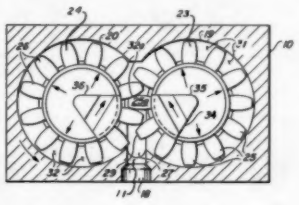
each impeller having a fluid inlet on at least one end coupled to the fluid inlet means of the cavity and to the hollow interior of each impeller,

each impeller further having a plurality of external means, having pockets therebetween,

each impeller further having a plurality of openings between said external means connecting the interior of each impeller with said pockets,

means coupled to at least one of said impellers for rotating the impellers to draw fluid through the fluid inlet means to the cavity and into the hollow interior of the impellers and through the openings between substantially all of said external means into the pockets between the external means,

said external means on each impeller adapted to intermesh



with the external means on the other impeller for compressing the fluid introduced into the pockets between the external means and the walls of the cavity and force the compressed fluid out of the pockets through the fluid outlet means, and

a gate fixedly positioned in the hollow interior of each impeller and positioned only immediately adjacent the fluid outlet means where the impellers intermesh and arranged to close only those selected ones of said openings in each of said impellers immediately adjacent said fluid outlet means as said impellers are rotated in said cavity and around said gate to prevent the compressed fluid from passing back into the interiors of the impellers.

4,710,111

ROTARY COMPRESSOR WITH OIL GROOVE BETWEEN JOURNAL AND JOURNAL BEARING

Masahiro Kubo, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 10, 1986, Ser. No. 837,830
Claims priority, application Japan, Mar. 14, 1985, 60-50887
Int. Cl.[4] F04C *18/356, 29/02*; F01M *1/00*; F16C *33/10*
U.S. Cl. 418—63 **11 Claims**

1. Rotary compressor comprising:

a journal having an eccentric portion;

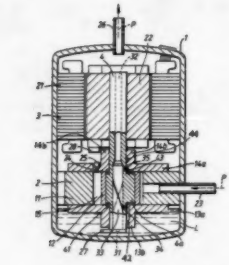
compression means including a cylinder and a rolling piston provided on said journal to suck, compress and discharge refrigerant gas by rotating said rolling piston eccentrically in the interior of said cylinder;

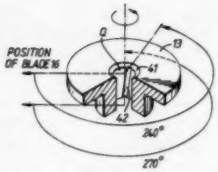
a motor to drive said journal;

journal bearing means for freely rotatably supporting said journal; and

an axial direction oil groove to introduce a lubricating oil into a gap between said journal and journal bearing means, wherein each axial portion of said axial direction oil groove is positioned on said journal in a circumferential position determined to correspondence to a low pressure

area of an oil film of said lubricating oil caused by a deflection of said journal due to dynamic imbalances in said





journal, including dynamic imbalances arising from the eccentricity of said rolling piston.

4,710,112

AUGER CONSTRUCTION FOR MACHINES FOR FORMING HOLLOW CORE CONCRETE SLABS

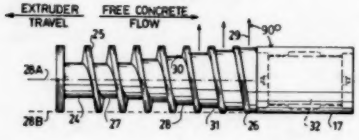
Ernst Martens, Winnipeg, Canada, assignor to Alphair Ventilating Systems Inc., Winnipeg, Canada

Filed Dec. 24, 1986, Ser. No. 945,949

Claims priority, application United Kingdom, Dec. 31, 1985, 8531919

Int. Cl.[4] B28B *21/52*

U.S. Cl. 425—64 **14 Claims**



1. An auger assembly for use in machines used for forming hollow core concrete slabs; said auger assembly comprising in combination an auger core having an upstream end and a downstream end, and an auger flighting on the outer surface of said auger core, the diameter of said flighting remaining substantially constant throughout the length thereof, the diameter of said auger core increasing from the upstream end to the downstream end thereof, whereby the depth of the flighting gradually decreases from a maximum at the upstream end to a minimum at the downstream end, the surface of said auger core between said flighting being substantially parallel to the longitudinal axis of said auger core and including a product core forming mandrel extending axially from the downstream end of said auger core.

4,710,113

APPARATUS FOR GRANULATING PLASTICS MATERIALS

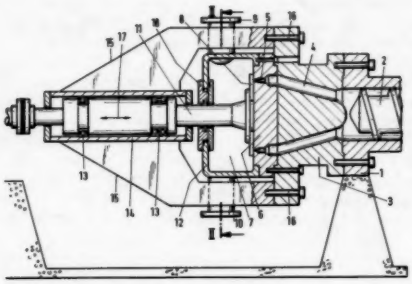
Jürgen Voigt, Wathlingen, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 21, 1986, Ser. No. 933,158

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1985, 3541500

Int. Cl.[4] B28B *11/16*

U.S. Cl. 425—67 **7 Claims**



1. An apparatus for granulating plastics material comprising a bearing housing, shaft bearing means disposed within said bearing housing, shaft means journalled to rotate in said bearing means and cutter means mounted on said shaft for rotation therewith externally of said housing, nozzle plate means disposed opposite said cutter means and spaced at a pre-set distance therefrom and means mounting said nozzle plate means to a base member, feed means supplying plastics materials to be granulated to said nozzle plate means, cutter housing means surrounding said cutter, said cutter housing means defining an inlet for water and an outlet disposed substantially diametrically opposite said inlet for discharging said water and granules produced by said cutter device, said water simultaneously acting as a cooling and granule conveying medium, said cutter device being immersed in said water during operation of said apparatus, and support arm means directly connecting said bearing housing to said nozzle plate mounting means wherein said cutting housing means is located therebetween, said support arms being thermally isolated from said cutter housing and from said base member.

4,710,114

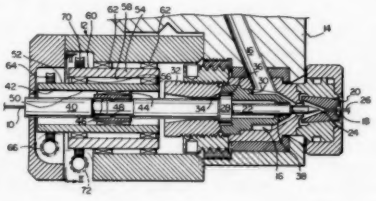
APPARATUS FOR INSULATING AN ELECTRICAL CONDUCTOR

John N. Garner, Kingston, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Apr. 18, 1986, Ser. No. 853,593

Int. Cl.[4] B29C *47/02, 47/12*

U.S. Cl. 425—110 **5 Claims**



1. An apparatus for forming an insulation layer around an electrical conductor comprising an extruder head having a die

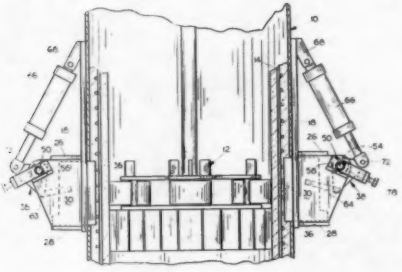
orifice, a die insert mounted for universal movement within the head, the insert having an outlet orifice for passage of the conductor along a passline towards the die orifice, and position control means to controllably position the insert within the head, said position control means comprising a first rotatable mounting eccentrically holding the die insert, said first rotatable mounting being rotatable about the die insert, and a second rotatable mounting radially outside of and eccentrically holding the first rotatable mounting, a driving means for rotatably turning each mounting, and means for monitoring and analyzing degree of eccentricity of the conductor and the insulation layer downstream from the extruder head and for issuing control signals dependent upon the degree of eccentricity of said conductor, the driving means responsive to the control signals to selectively rotate the mountings and universally move the insert in an appropriate direction to lessen the degree of eccentricity of the conductor and the insulation layer.

4,710,115

CAGE POSITIONING DEVICE FOR USE WITH A CONCRETE PIPE FORM

James L. Tucker; Terry R. Landen, and Robert L. Schelby, all of Lincoln, Nebr., assignors to Nebco, Inc., Lincoln, Nebr.

Filed May 5, 1986, Ser. No. 859,368
Int. Cl.[4] B28B *21/56, 21/26*
U.S. Cl. 425—117 **10 Claims**



1. In combination,

a hollow cylindrical concrete pipe form having upper and lower ends, and inner and outer wall surfaces,

said form being adapted to receive a cylindrical reinforcing cage means therein which will be embedded in the concrete pipe formed in said form,

and a plurality of cage positioning devices mounted on the outer wall surface of said form,

each of said cage positioning devices comprising a vertically disposed guide frame means having a horizontally slidable slide member mounted therein adapted to be moved between operative and inoperative positions, said slide member having inner and outer ends, the inner end of said slide member being moved inwardly through an opening formed in the form, for engagement with the reinforcing cage, when in its operative position,

a cam means pivotally mounted on said guide frame means in operative engagement with said slide for moving said slide relative to said guide frame means, said cam means movable along a pivotal path,

means located in said pivotal path for limiting the pivotal movement of said cam means to limit the inward movement of said slide,

a power cylinder including a base end and a rod end,

said base end of said power cylinder being operatively secured to said form above said cam means,

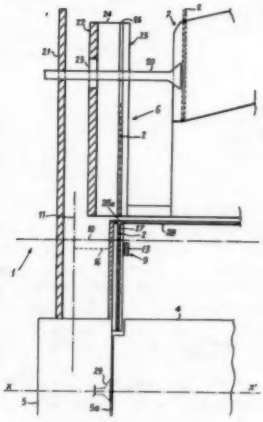
and means pivotally connecting the rod end of said power cylinder to said cam means whereby extension of said power cylinder will cause pivotal movement of said cam means which causes said slide to be moved inwardly into said form.

4,710,116

SYSTEM FOR FEEDING FILM, FORMING A PARTIAL COATING AT LEAST OF A MOLDED OBJECT, INTO A MOLD

Pierre Dromigny, 54 avenue de Versailles, 75016 Paris, France, and Théodore Schöttli, Duessenhofen, Switzerland, assignors to Pierre Dromigny, Paris, France

Filed Jun. 24, 1986, Ser. No. 877,742
Int. Cl.[4] B29C *49/24*
U.S. Cl. 425—125 **6 Claims**



1. In a molding machine, comprising a mold having a fixed part and a movable part, and a magazine for films each forming at least a partial coating of a molded object, a system for bringing a film between the fixed part of the mold and the part thereof which is movable, in a predetermined direction of movement, with respect to the fixed part, comprising:

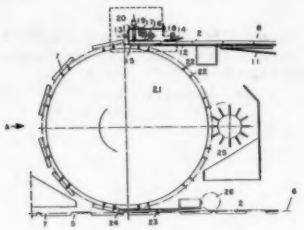
a device for transferring films precut to the desired format, one by one, from the magazine to a waiting position in the vicinity of the mold; and

a device for transporting the film from the waiting position to a working position in which the film is situated between the fixed and movable parts of the mold, including means for holding the film in position during its transport from the waiting position to the working position, and two cooperating members, of the rack or screw type, meshing with each other, the first of which is parallel to the direction of movement of the movable part of the mold and is fixed to one of the parts thereof, and the second of which is fixed to the means for holding the film in position and may slide in the movable part of the mold, so that any movement of the movable part, in said direction of movement, with respect to the fixed part, causes sliding of the second member in the movable part of the mold and a given concomitant movement, in a plane parallel to the front face of the movable part of the mold, of said holding means towards or away from said front face.

4,710,117
APPARATUS FOR PLACING CONFECTIONERY WAFER PIECES INTO MOLDING DEPRESSIONS OF CASTING MOLDS

Franz Haas, Sr., Vienna; Franz Haas, Jr., Leobendorf, and Johann Haas, Klosterneuburg, all of Austria, assignors to Franz Haas Waffelmaschinen Industriegesellschaft m.b.H., Vienna, Austria

Continuation-in-part of Ser. No. 315,285, Oct. 27, 1981, abandoned. This application Mar. 27, 1986, Ser. No. 844,835
Claims priority, application Austria, Oct. 27, 1980, 5302/80; Apr. 3, 1985, 1015/85
Int. Cl.[4] B29D *3/00*
U.S. Cl. 425—126 R **42 Claims**



1. An apparatus for placing pre-cut wafer pieces into molding depressions of casting molds, which comprises

(a) a molding-conveying means for continuously conveying the casting molds in a first plane of conveyance in a first direction of travel in such a manner that the casting mold depressions are arranged to form a plurality of longitudinal rows extending in the first direction of travel and a plurality of transverse rows extending transversely to the first direction of travel, the longitudinal rows having predetermined transverse spacings and the transverse rows having predetermined longitudinal spacings therebetween,

(b) a separating device for feeding the pre-cut wafer pieces in a second plane of conveyance in a secnd direction of travel extending opposite to the first direction of travel, the second plane of conveyance being spaced a substantial distance above the first plane of conveyance, the separating device having

(1) diverging guide channels extending in the second direction of travel and laterally moving the pre-cut wafer pieces apart until they have the same transverse spacings as the longitudinal rows of casting mold depressions, and

(c) a transfer device adjoining the separating device in the second direction of travel for receiving the moved-apart pre-cut wafer pieces from the separating device and for placing said wafer pieces into the casting mold depressions, the transfer device bridging the space between the first and second planes of conveyance and comprising

(1) a rotating wafer piece carrying drum arranged between the first and second planes of conveyance, the planes of conveyance extending substantially tangentially to the rotating drum and the drum having an axis of rotation extending perpendicularly to the first direction of travel and parallel to the first plane of conveyance, the drum having wafer piece retaining prongs distributed above the peripheral surface thereof and adapted to register with respective ones of the casting mold depressions, and

(2) common drive means for the mold-conveying means and the rotating drum,

(d) a support plate for the pre-cut wafer pieces arranged in the second plane of conveyance between the separating device and the rotating drum;

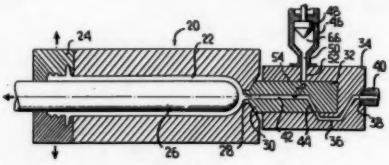
(e) arresting means cooperating with the support plate for temporarily arresting the pre-cut wafer pieces on the support plate until respective ones of said prongs on the rotating drum have retained a leading transverse row of said pre-cut wafer pieces, the arresting means comprising a movable stop for arresting the leading transverse row of the wafer pieces moving on the support plate in the second direction of travel into engagement with the movable stop, and

(f) a raking device arranged above the casting molds conveyed in the first plane of conveyance for stripping the pre-cut wafer pieces off the retaining prongs as they are moved into registry with respective ones of the casting mold depressions by the rotating drum and project thereinto.

4,710,118
APPARATUS FOR FORMING PREFORMS WITH INTERNAL BARRIER

Suppayan M. Krishnakumar, Nashua, and Thomas E. Nahill, Salem, both of N.H., assignors to Continental PET Technologies, Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 581,409, Feb. 17, 1984, Pat. No. 4,609,516. This application May 12, 1986, Ser. No. 861,854
Int. Cl.[4] B29C *31/06*
U.S. Cl. 425—130 **11 Claims**



1. Apparatus for forming a laminated preform having inner and outer first layers, inner and outer second layers within said first layers, and an innermost third layer, said apparatus comprising a conventional preform forming injection mold unit including a mold element and a cooperating core defining a mold cavity, at least one supply of thermoplastic resin under pressure and a separate supply of barrier material under pressure, a valve between said supplies and said mold unit, and means for actuating said valve in sequence to admit first a preselected quantity of thermoplastic resin to said mold cavity to form said first layers, then a preselected quantity of barrier material to said mold cavity to form said second layers, and finally more thermoplastic resin to said mold cavity to at least form said third layer.

4,710,119
INJECTION MOLDING MACHINE USING SERVO MOTOR AND HAVING MOLD PROTECTING FUNCTION

Hiromasa Otake, Tanashi, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP85/00624, § 371 Date Jul. 8, 1986, § 102(e) Date Jul. 8, 1986, PCT Pub. No. WO86/02878, PCT Pub. Date May 22, 1986
PCT Filed Nov. 8, 1985, Ser. No. 885,610
Claims priority, application Japan, Nov. 9, 1984, 59-235258
Int. Cl.[4] B29C *45/84*
U.S. Cl. 425—136 **3 Claims**

1. A mold injecting machine using a servo motor and having a mold protecting function, comprising:

a clamp mechanism for operating a mold to perform mold clamping;

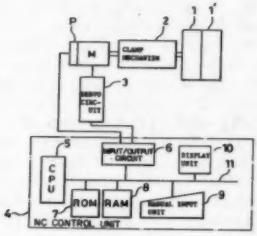
a servo motor, coupled to said clamp mechanism, for driving said clamp mechanism;

a position detector, coupled to said servo motor, for detect-

ing a positon of the mold and producing a detection output; and

an NC control unit, coupled to said servo motor and said position detector, for controlling said servo motor, said NC control unit having a torque limit function for suppressing a torque output from said servo motor below a predetermined value, said NC control unit including:

means for inputting a preset mold protection start position, a preset mold contact position and a preset predetermined time period, the preset predetermined time period being set to a value sufficient for allowing the mold to move from the preset mold protection start position to the preset



mold contact position when no foreign matter exists in the mold;

mold position discriminating means for discriminating whether the preset mold protection start position and the preset mold contact position have been reached based on the detection output from said position detector;

elapsed time discrminating means for discriminating whether the preset predetermined time period has elapsed after a point in time at which the mold reaches the preset mold protection start position; and

alarm means for generating an alarm when the predetermined period of time has elapsed before the mold reaches the preset mold contact position.

4,710,120

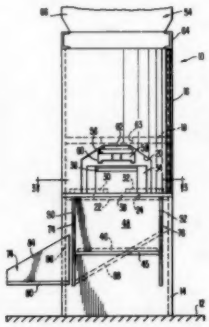
APPARATUS FOR REMOVING A DIE FROM A DIE RING

James B. Chapman, Pierce City, Mo., assignor to Revere Copper and Brass Incorporated, Stamford, Conn.

Filed Dec. 17, 1985, Ser. No. 809,977

Int. Cl.⁴ B29C *47/08*

U.S. Cl. 425—185 **5 Claims**



1. In combination, apparatus comprising an assembly in the form of a housing surrounding an enclosed space along a substantially vertical axis, a first working surface supported within said housing between its ends, said first working surface disposed stationarily in substantially a horizontal plane and including an opening, a hopper in said housing below said opening, locator means formed by a pair of members each supported by said first working surface on opposite sides of said opening, said members having a side surface extending vertically of said first working surface and disposed in positions whereby said side surfaces confront one another along paths that converge from the region of a point of tangency at equiradial and equiangular locations from the axis of said opening and a diameter through said axis, repsectively, said members, further, forming a pocket defined by said points of tangency for positional receipt of a ring-like structure carrying a removable member, and mechanical means supported stationarily within said housing above said first working surface, said mechanical means including a plunger having a ring-like extension toward said opening around an outer periphery, said plunger being movable in opposite directions along the axis of said opening whereby said ring-like extension in downward movement is received within said ring-like structure for contacting said removable member around its outer edge with a force to cause said removable member to release from said ring-like structure and fall through said opening into said hopper.

4,710,121

INJECTION MOLD CHANGING UNIT

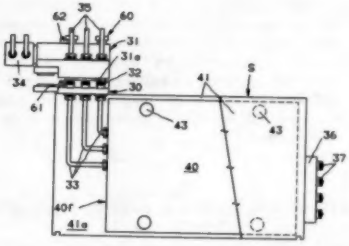
Karl Hehl, Arthur-Hehl-Strasse 32, D-7298 Lossburg 1, Fed. Rep. of Germany

Filed Mar. 17, 1986, Ser. No. 840,457

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 3509518

Int. Cl.⁴ B29C *45/26*

U.S. Cl. 425—190 **16 Claims**



1. In a mold closing unit for an injection molding machine, including an exchangeable injection mold assembly having a mold body bounded on opposite sides thereof by back plates secured thereto; means defining a clamping space where said mold body is clamped in a working position thereof; a conditioning table situated adjacent said clamping space; said injection mold assembly being movable to and onto said conditioning table from a location outside said mold closing unit or from said clamping space of said mold closing unit; said injection mold assembly being movable from said conditioning table to said clamping space or to said location outside said mold closing unit; supply line coupling, means for operatively connecting to and disconnecting from one another conduit terminals of mold-side supply conduits forming a permanent part of said injection mold assembly and machine-side supply conduits forming a permanent part of said injection molding machine externally of said injection mold assembly; said supply line coupling means being formed of a mold-side coupling half containing terminals of said mold-side supply conduits and being fixedly attached to said mold body, and a machine-side coupling half containing terminals of said machine-side supply conduits and being arranged to be movable between said conditioning table and said clamping space; said mold-side coupling half and said machine-side coupling half being joinable to and disconnectable from, one another along a horizontal parting plane of said supply line coupling means for coupling the

machine-side and mold-side conduits to one another for preheating said injection mold assembly on said conditioning table; said injection mold assembly being movable from said conditioning table into said working position in said clamping space horizontally and perpendicularly to a closing direction of said mold losing unit without disconnection of said supply line coupling means; the improvement wherein said machine-side coupling half is situated above the conditioning table; further where in the improvement comprises

(a) a coupling drive means mounted on said machine-side coupling half for performing coupling and uncoupling strokes;

(b) force-transmitting connecting means connecting said coupling drive means with said machine-side coupling half for effecting coupling and uncoupling motions, respectively, of said machine-side coupling half during respective coupling and uncoupling strokes of said coupling drive means;

(c) vertically oriented coupling pins being connected at least indirectly to said coupling drive means and being further arranged to guide said machine-side coupling half during said coupling and uncoupling motions thereof; each said coupling pin having opposite first and second ends;

(d) a holding element mounted on said conditioning table; and

(e) first, second, third and fourth inter-engagement means; said first and second interengagement means forming part of said first and second ends, respectively, of each said coupling pin; said third and fourth engagement means forming part of said holding element and said mold-side coupling half, respectively; said first and third engagement means being arranged for entering into an interengaging position with one another and said second and fourth engagement means being arranged for entering into an interengaging position with one another dependent upon a conveying motion of said mold assembly; in said interengaging position said coupling drive means and said machine-side coupling half being supported for executing the coupling stroke to move said machine-side coupling half into an operative engagement with said mold-side coupling half by said coupling stroke of said coupling drive means.

4,710,122

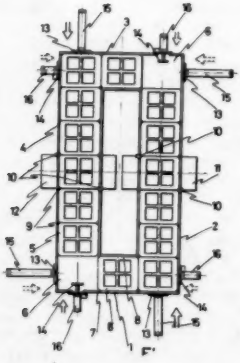
MACHINE FOR MANUFACTURING FLAT BODIES IN A CONTINUOUS LINE

Eliseo H. Villanueva, c/ Cid, s/n - Polígono Torrubero, Museros (Valencia), Spain

Filed Mar. 7, 1986, Ser. No. 837,589

Int. Cl.[4] B28B *5/04*

U.S. Cl. 425—259 **4 Claims**



1. Machine for manufacturing flat bodies in a continuous linear process comprising, a closed circuit static sliding runway having four interconnected rectilinear sections connected together to form a rectlinear closed circuit, each rectilinear section having a head end and a tail end which is opposite from the head end, a plurality of substantially quadrangular moulds each having at least one space for receiving material to form a piece to be molded, each space having a bottom for supporting the material, said moulds having dimensions which comprise a sub-multiple of the length of each rectlinear section with all rectilinear sections being completely filled with moulds except for opposite corners of said runway, each mould having bevelled vertices which, with the bevelled vertices of an adjacent mould in the runway form an angular vertical channel, feelers operatively connected to said runway for engagement in said angular vertical channels to center each mould on at least two of said rectilinear sections at a location corresponding to a press site where material in the space of each mould is to be pressed, a pusher mounted at the head end of each rectilinear section, each pusher having a cylinder with a stroke which is at least equal to a dimension of moulds in the rectangular section serviced by that pusher, for pushing all moulds in the rectangular section serviced by that pusher, for pushing all moulds in that rectangular section in a linear passage along that rectangular section, a buffer mounted at the tail end of each rectangular section and cooperating with the pusher of that rectangular section for receiving moulds pushed by the pusher, each rectangular section having its own pusher plus buffer pair, each buffer having a cylinder for withdrawing the buffer as the cylinder of the pusher extends the pusher for synchronizing movement of the pusher plus buffer pairs for moving the moulds along the rectangular sections in the linear passage, and a microswitch operatively connected to each of the cylinders of the pusher plus buffer pairs for activating a cylinder plus buffer pair which is downstream of a previously activated pusher plus buffer pair after the moulds of the previous pusher plus buffer pair have been moved along their respective rectangular section.

4,710,123

EXTRUSION DEVICE FOR THE PRODUCTION OF HONEYCOMB STRUCTURES

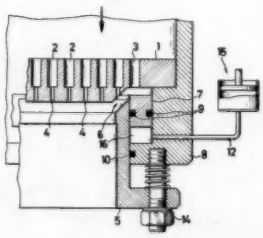
Anton Ziebig, Ottensoos; Hans Brigasky, and Willi Lewand, both of Lauf, all of Fed. Rep. of Germany, assignors to Hoechst CeramTec Aktiengesellschaft, Selb, Fed. Rep. of Germany

Filed Mar. 19, 1986, Ser. No. 841,320

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1985, 3510181

Int. Cl.[4] A01J *21/00*

U.S. Cl. 425—464 **2 Claims**



1. An extrusion device for the production of a honeycomb structure from plastic material comprising:

a stationary frame part having a flange;

a die part supported on the frame part, the die part having feed passageways for the plastic material on an inlet side and shaping slots communicating with the feed passageways on an outlet side;

a die element, which with the die part forms on the outlet

side a die passageway for a skin of the honeycomb structure;

first adjustable means for adjusting the die element to vary the skin thickness; and

second adjustable means downstream of the feeds for adjusting the flow rate of the plastic material in the die passageway.

4,710,124

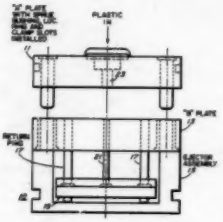
AUTOMATIC PART AND RUNNER SEPARATOR

James Harrison, 13182 Marshall La., Tustin, Calif. 92680

Filed Nov. 13, 1985, Ser. No. 797,692

Int. Cl.[4] B29C *45/40, 45/42, 45/43*

U.S. Cl. 425—554 **14 Claims**



1. A runner and product separator for sequentially separating a runner and a molded product from an injection mold assembly comprising:

first and second mold portions disposed in retractable mutual engagement, said first and second mold portions having mating surfaces formed to mold a runner and a product therebetween;

an ejector plate assembly disposed within said second mold portion, said ejector plate assembly being operative to retractably translate a first distance within said second mold portion;

a plurality of first ejector pins connected to said ejector plate assembly so as to translate within said second mold portion to strike, and separate from said second mold portion, only one of said runner and said product; and

a pin extension mechanism disposed within said second mold portion and connected to a second ejector pin, said pin extension mechanism being adapted to retractably translate said second ejector pin independent of the translation of said ejector plate assembly to cause said second ejector pin to strike and separate from said second mold portion the other of said runner and said molded product.

4,710,125

SAFETY DEVICE FOR OIL BURNER

Kazuharu Nakamura; Motoki Matsumoto; Akinobu Kondo, and Kiyonobu Ito, all of Aichi, Japan, assignors to Toyotomi Kogyo Co., Ltd., Aichi, Japan

Filed Apr. 3, 1986, Ser. No. 847,513

Claims priority, application Japan, Apr. 11, 1985, 60-77287

Int. Cl.[4] F23N *5/24*

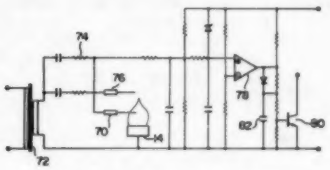
U.S. Cl. 431—22 **5 Claims**

1. A safety device for an oil burner comprising:

a first flame electrode arranged at a position to be exposed to flame formed due to normal combustion in said oil burner;

means for applying an AC voltage between said first flame electrode and said oil burner so that normal combustion in said oil burner may be detected when a DC flame current flows through said first flame electrode due to the rectification of flame carried out between said first flame electrode and said oil burner;

a second flame electrode arranged at a position to which flame of said normal combustion in said oil burner does not reach, said means for applying an AC voltae including circuit means for providing a single source of current to said first and second electrodes and dividing current from said single source between said first and second flame electrodes when said second electrode is reached by an excessive flame;



detection means for detecting abnormal combustion due to either a failure in the flowing of said flame current through said first flame electrode when said flame is too small, or a decrease in said flame current flowing through said first flame electrode because of said division of current between said first and second flame electrodes when said flame is excessive.

4,710,126

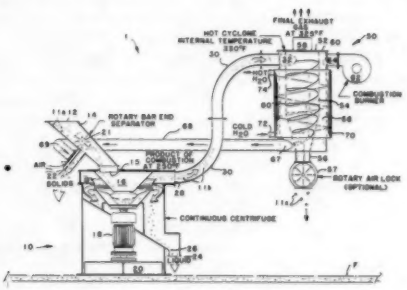
METHOD AND APPARATUS FOR DRYING METAL CHIPS

Larry D. Areaux, Portage, and Robert H. Dudley, Richland, both of Mich., assignors to Pre-Melt Systems, Inc., Kalamazoo, Mich.

Filed May 23, 1986, Ser. No. 866,795

Int. Cl.[4] F27B *15/00*

U.S. Cl. 432—58 **34 Claims**



1. In a metal chip drying apparatus, the combination comprising

cyclone separator means having a wall, said wall being of heat-conducting material and having inner and outer surfaces, and having inlet means for the entry into said cyclone separator means of gas-entrained metal chips,

outlet means for the exit of dried chips from said cyclone separator means,

outlet means at the opposite end of said cyclone separator means for the exit of exhaust gases therefrom,

combustion chamber means about the outer surface of the wall of said cyclone separator means for the combustion of fuel therein,

inlet means into said combustion chamber means for the entry of heat and flame thereinto,

burner means associated with said inlet means into said combustion chamber means and with fuel source means, and

outlet means for exit of gaseous products of combustion from said combustion chamber means.

4,710,127

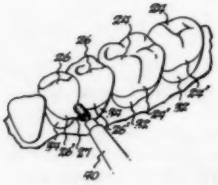
METHOD AND DEVICE FOR ESTABLISHING NEW DENTAL OCCLUSAL SCHEME FOR PATIENT

William D. Bellavia, Medina, N.Y., and William Missert, 120 Halstead St., Rochester, N.Y. 14610, assignors to William Missert, Rochester, N.Y.

Continuation of Ser. No. 613,887, May 24, 1984, abandoned. This application Jun. 26, 1986, Ser. No. 878,637

Int. Cl.[4] A61C *5/00*

U.S. Cl. 433—215 **21 Claims**



1. A method of establishing a new dental occlusal scheme comprising the steps of making casts of a person's upper and lower natural teeth, constructing a build-up of material over one cast, positioning the other cast in articulated position relative to said one cast to produce a desired occlusal scheme relationship of said material with said other cast, making an overlay device from said material, sculpting said overlay device to produce an overlay unit resembling a plurality of overlay cap members resembling outer portions of crowns of natural teeth connected by struts with said cap members having the desired occlusal scheme and morphology, bonding said overlay unit to said person's natural teeth, severing and removing said struts after said overlay unit has been bonded to said person's natural teeth to provide complete divisions between adjacent cap members which merge into the divisions between said person's natural teeth on which said cap members are mounted, and shaping said individual cap members to merge into the person's natural teeth on which they are mounted.

4,710,128

SPATIAL DISORIENTATION TRAINER-FLIGHT SIMULATOR

Robert H. Wachsmuth, Elkins Park, and Donald W. Brusch, Newtown, both of Pa., assignors to Environmental Tectonics Corporation, Southampton, Pa.

Filed Oct. 25, 1984, Ser. No. 664,807

Int. Cl.[4] G09B *9/08*

U.S. Cl. 434—46 **32 Claims**

1. Spatial disorientation trainer-flight simulator, comprising:

a cockpit;

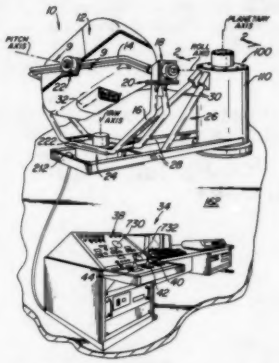
means for mounting the cockpit for independent rotation about pitch, roll and yaw axes;

motor means for rotating the cockpit about the pitch, roll and yaw axes in response to speed command signals and for rotating the cockpit about at least one of said pitch, roll and yaw axes at a sub-threshold speed in response to a sub-threshold speed command signal to demonstrate a vestibular illusion;

pilot manipulable control means located at said cockpit for generating pilot command signal;

operator control means located at a console station for generating operator command signals;

cockpit computer means located at said cockpit and console computer means located at said console station, said cockpit and console computer means being interconnected to generate said speed command signals including said sub-threshold speed command signal in response to at least one of said pilot and operator command signals; and



means including a slip ring assembly for interconnecting said cockpit and console computer means.

4,710,129

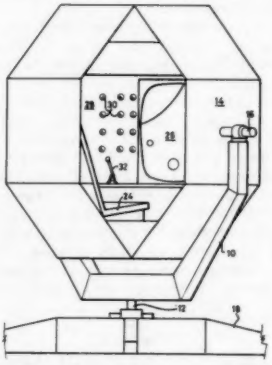
SIMULATION DEVICE

Geoffrey C. S. Newman, Watton; Andrew L. Pilkington, Attleborough, and Kenneth H. Winch, Diss, all of England, assignors to Scortech Mech. Ltd., Attleborough, United Kingdom

Filed Feb. 6, 1986, Ser. No. 827,277

Int. Cl.[4] A63G *31/02*

U.S. Cl. 434—55 **10 Claims**



1. A simulation device, comprising:

user occupancy means;

a yoke as a support on which said user occupancy means is mounted with freedom for rotational movement about a first axis extending through said occupancy means;

a structure having a base on which said yoke is mounted with freedom for rotational movement about a second axis generally normal to the first axis and extending through said occupancy means;

prime mover means for moving said occupancy means at least in rotation about said first axis and said yoke in rotation at least about said second axis;

manual control means, carried by said occupancy means, for causing said prime mover means to drive said occupancy means and said yoke in a controlled manner at least in rotation respectfully about said first axis and said second axis;

a VDU carried by said occupancy means, said VDU being capable of displaying a computer generated picture responding to picture signals fed thereto;

sensor means for sensing rotational movement of said occupancy means, said sensor means comprising a first sensor directly responsive to rotation of said user occupancy means relative to said yoke and a second sensor directly responsive to rotation of said yoke relative to said base structure so that there is one sensor for each axis of rotation thereby permitting said sensor means to be responsive to all movement of said user occupancy means, said sensor means not forming a part of, and not being responsive to, said manual control means; and

a computer which is fed from said sensor means and which generates picture signals fed to the VDU so as to cause the display to scroll in synchronized relationship to said rotational movements of said occupancy means and said yoke respectively about said first axis and said second axis, said movement including those produced by the use of said manual control means.

4,710,130

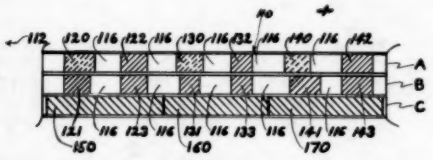
DICHOTIC-DIOTIC PAIRED-ASSOCIATION FOR LEARNING OF VERBAL MATERIALS

Louis Aarons, 8348 Niles Center Rd., Skokie, Ill. 60077

Filed Dec. 24, 1986, Ser. No. 946,037

Int. Cl.[4] G09B *19/06, 50/60, 50/004*

U.S. Cl. 434—157 **20 Claims**



1. Audio medium for educational use, having plural channels from which prerecorded sounds may be reproduced, comprising a multiplicity of sets or prerecorded sounds on said medium, each said set having a dichotic presentation and a diotic presentation, each said dichotic presentation having a stimulus on one of said channels and a first response, corresponding to said stimulus, on a second of said channels, and each said diotic presentation having a second response on both said one and said second channels, said second response of each said set corresponding to the said stimulus of that set.

4,710,131

LIMITED ROTATION TWIST CAPSULE

Kenneth E. Bonenberger, Blacksburg, Va., assignor to Litton Systems, Inc., Blacksburg, Va.

Filed May 12, 1986, Ser. No. 861,709

Int. Cl.[4] H01R *39/02*

U.S. Cl. 439—13 **3 Claims**

1. A limited rotation twist capsule having an axis of rotation comprising:

a stator having a shaft extending therefrom which defines the axis of rotation of the twist capsule;

a rotor mounted on said shaft and rotatable relative to the stator;

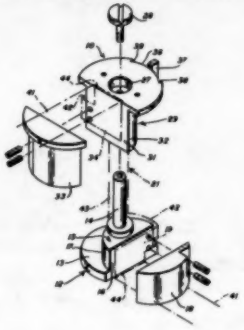
a continuous flexible cable having end portions extending from the stator and the rotor;

first means for clamping a first portion of the continuous cable to the stator;

second means for clamping a second portion of the continuous cable to the rotor;

an intermediate portion of the continuous cable located between said first portion and said second portion; and

two right angles in the intermediate portion of the continuous cable dividing the intermediate portion into three segments, whereby two of the segments are perpendicular to the axis of the twist capsule and one segment is parallel to the axis of the twist capsule, said intermediate portion



having a "Z" shape and a length which is greater than the distance between the first means and the second means whereby the rotor is free to rotate a preselcted number of degrees relative to the stator.

4,710,132

ELECTRICAL PLUG CONNECTOR STRIP

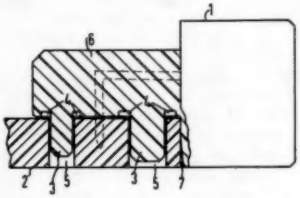
Kurt Glomb, Germering; Heinz Niggl, Poecking; Leo Pelzl, Holzkirchen, and Karl Zell, Niederpoecking, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 2, 1985, Ser. No. 783,112

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1984, 3441310

Int. Cl.[4] H01R *9/09*

U.S. Cl. 439—79 **1 Claim**



1. In an electrical plug connector strip provided with a plurality of rows of contact elements that are connected by means of terminal elements to a printed circuit board of an electrical assembly, the improvement comprising:

a plurality of flanges having downwardly directed insertion posts provided on the back side of said plug connector strip to engage in bores in said circuit board;

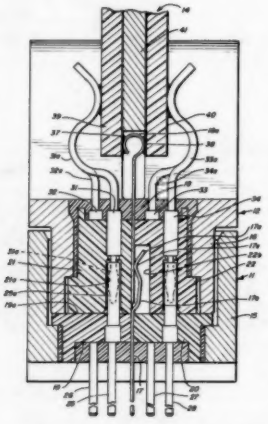
engagement means between said strip and said circuit board to provide increasing engagement between said strip and said circuit board upon insertion of said posts into said bores, whereby said plug connector strip can be secured to said circuit board by means of a plugging operation;

two of said insertion posts being provided per flange, said insertion post closest to the plug connector strip body has a larger diameter and a greater length in comparison to the second insertion post; and

said engagement means comprising a pinch rib having a triangular cross section fashioned on the strip body opposite every insertion post positioned closest to said strip body, the cross section of said pinch rib enlarging in the direction toward the underside of said flange to increas-

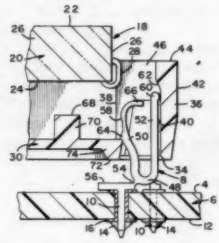
ingly engage a forward edge of said circuit board as said connector strip is engaged into said circuit board.

4,710,133
ELECTRICAL CONNECTORS
Richard J. Lindeman, Wood Dale, Ill., assignor to TRW Inc., Redondo Beach, Calif.
Filed Jun. 19, 1986, Ser. No. 876,179
Int. Cl.[4] H01R *4/66*
U.S. Cl. 439—92 **16 Claims**



1. An electrical connector assembly including a pair of mating connectors and arranged for high velocity propagation of electrical signals along a plurality of paths between first circuit means connected to one connector and second circuit means connected to the other connector, each connector comprising: a plurality of contact elements for propagation of said signals, each having connection means at one end thereof for connection to a terminal of said first circuit means and having a contact surface at an opposite end thereof for engagement with a contact surface of a contact element of the mating connector, a ground plate having connector means along one edge thereof for connection to a ground terminal of said first circuit means and having contact surface means along an opposite edge thereof for engagement with contact surface means of a ground plate of a mating connector, said contact surface means of one connector being in the form of multi-spring-fingered contact surface means along said opposite edge thereof for engagement with oppositely disposed contact surface means of a continuous ground plate of the mating connector, and each connector comprising support means for supporting said contact elements thereof in fixed and electrically insulated relation to each other and to said ground plate thereof, said contact elements of each connector including a group of elements supported in at least one row in longitudinally spaced parallel relation to said ground plate thereof, and said ground plate of each connector extending in a common plane and longitudinally for substantially the full length of said row of contact elements thereof.

4,710,134
LOW INSERTION FORCE CHIP CARRIER CONNECTOR WITH MOVABLE HOUSING
Iosif Korsunsky, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Sep. 29, 1986, Ser. No. 913,056
Int. Cl.[4] H01R *9/09*
U.S. Cl. 439—264 **20 Claims**



1. A chip carrier connector for an integrated circuit chip carrier, comprising:

a housing having a rectangular recess therein which is dimensioned to receive the chip carrier, and a rectangular base having walls extending normally from edges of the rectangular base;

the walls defining the recess for the chip carrier, each of the walls having an internal surface which is opposed to a chip carrier side surface when a chip carrier is placed in the recess the internal surface having a camming surface located thereon, each of the walls having terminal-receiving cavities extending inwardly thereof from its internal surface;

electrical terminals positioned in the terminal-receiving cavities, the terminals being movable such that contact portions of the terminals are located in the cavities when the housing is in a first position and in the recess when the housing is in a second position;

the housing being movable with respect to the terminals, whereby as the chip carrier is inserted into the recess, the housing is positioned in the first position with the terminals completely in the cavities to allow for low insertion force of the carrier into the recess of the housing, as insertion continues the chip carrier contacts a surface of the housing causing the chip carrier and the housing to move to the second position, the second position being defined when a bottom surface of the housing contacts a circuit board, as this movement occurs the camming surfaces of the walls cooperate with the terminals to move the terminals against contact pads of the chip carrier, causing the terminals to create a wiping action on the contact pads, ensuring a positive electrical connection is effected between the terminals and the contact pads.

4,710,135
ELECTRICAL CONNECTOR HAVING INTEGRAL LATCH MEANS
Kohji Aoyama, Tokyo, and Masaro Noguchi, Sagamihara, both of Japan, assignors to AMP Incorporated, Harrisburg, Pa.
Filed Jul. 10, 1986, Ser. No. 884,157
Int. Cl.[4] H01R *13/639*
U.S. Cl. 439—354 **14 Claims**

1. An electrical connector comprising a dielectric matable receptacle housing and a dielectric matable plug housing, the receptacle housing having a plurality of terminals therein, the plug housing having a like plurality of matable terminals located therein, the electrical connector being characterized in that:

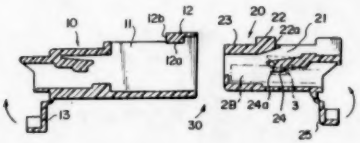
a resilient latching arm is located between sidewalls of the plug housing forming part of an upper wall of the plug

housing, the latching arm having a front portion which is pivotally connected to the sidewalls of the plug housing and a rear portion which has an engaging projection located therein,

a lance is provided in the plug housing rearwardly of the latching arm forming another part of the upper wall of the plug housing,

inner ends of the resilient latching arm and the lance are spaced from each other in overlapping relationship, forming an aperture therebetween,

an engaging portion is provided on the receptacle portion, the engaging portion positioned to cooperate with the latching arm,



whereby as the receptacle housing and the plug housing are mated together, the latching arm of the plug housing comes in contact with the engaging portion of the receptacle housing, such that as mating continues, the engaging projection of the latching arm engages the engaging portion, causing the latching arm to move inwardly, and as mating is completed, the projection moves past the portion, allowing the latching arm to resiliently return to its unstressed position, thereby placing the projection in an aperture of the receptacle housing in contact with the portion, latching the housings together and preventing the housings from unwanted disengagement.

4,710,136

MOUNTING STRUCTURE FOR ELECTRONIC APPARATUS OR THE LIKE

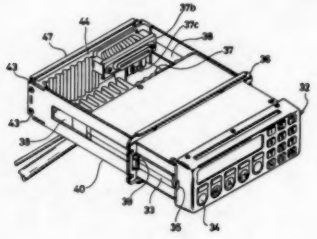
Takeshi Suzuki, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Japan

Continuation of Ser. No. 468,698, Feb. 22, 1983, abandoned. This application Apr. 11, 1985, Ser. No. 722,195

Claims priority, application Japan, Feb. 26, 1982, 57-26910[U]

Int. Cl.[4] H01R *13/62*

U.S. Cl. 439—374 **7 Claims**



1. A structure for mounting an apparatus having at least a pair of opposite sides and front and rear ends, a first coupling device on the rear end of said apparatus for establishing an electrical circuit connection between the apparatus and the structure when the apparatus is inserted into said structure, means for extending said circuit connection to an external source, said structure comprising a pair of opposed stationary side members having front and rear ends for slidably engaging the sides of said apparatus to having a second coupling device for engaging said first coupling device of from said structure, a movable rear member in said structure having a coupling element for engaging the coupling element of said apparatus, said movable rear member being movably engaged with said stationary side members for movement over a predetermined distance along a portion of the length of said side members adjacent to the rear ends of said apparatus and said structure so that the movable rear member is moved over said predetermined distance with said apparatus when said coupling devices are engaged with each other, a first heat radiating member having a plurality of heat dissipating cooling fins secured to said movable rear member for partially radiating heat generated by said apparatus into the air, and a second stationary heat radiating member secured to said apparatus and having a plurality of heat dissipating cooling fins of a configuration which is complementary to the configuration of the fins of said first heat radiating member, the fins of said first and second heat radiating members engaging each other with the fins of said first heat radiating member interdigitating with said fins of said second heat radiating means when said apparatus is inserted into said structure for partially transmitting said heat from said first to said second heat radiating member and for guiding said coupling devices into alignment with each other.

4,710,137

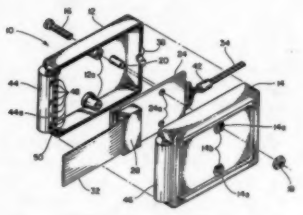
CABLE STRAIN RELIEF

Terry A. Perdue, St. Joseph, and William Cubbage, Coloma, both of Mich., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 1, 1986, Ser. No. 936,415

Int. Cl.[4] H01R *13/56*

U.S. Cl. 439—457 **9 Claims**



1. For use in a housing having a first elongated aperture defined by at least one inner edge of said housing through which a first single flat electrical cable extends and a second aperture through which a second electrical cable having a generally circular cross-section extends, an arrangement for limiting the bending strain exerted upon the electrical cables comprising:

a first housing section having first and second recessed edge portions;

a second housing section having third and fourth recessed edge portions, said first and second housing sections being of identical size and configuration and adapted for engagement along respective edges thereof and wherein said first and third recessed edge portions are disposed adjacent to one another so as to form the first elongated aperture in the housing and said second and fourth recessed edge portions are disposed adjacent one another so as to form the second generally circular aperture in the housing;

a first convex projection disposed on an outer surface of said first housing section immediately adjacent to the first recessed edge portion thereof;

a second convex projection disposed on an outer surface of said second housing section immediately adjacent to the second recessed edge portion of said second housing section, wherein said first and second convex projections each have a given radius of curvature which limit the angular bending of and the bending strain exerted upon the first single flat electrical cable;

a first curvilinear projection disposed on the outer surface of

said first housing section adjacent to the second recessed edge portion thereof;

a second curvilinear projection disposed on the outer surface of said second housing section adjacent to the fourth recessed edge portion thereof, wherein said first and second curvilinear projections limit the angular bending of and the bending strain exerted upon the second generally circular electrical cable; and

first and second bosses coupled respectively to said first and second housing sections for engaging opposed surfaces of a PC board positioned within the housing and coupled to the first and second electrical cables in maintaining the PC board securely in position within the housing.

4,710,138

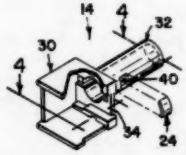
ELECTRICAL CONNECTOR APPARATUS

James D. Bradley, Mound, and George B. Pfeffer, Minnetonka, both of Minn., assignors to ADC Telecommunications, Inc., Minneapolis, Minn.

Filed Dec. 1, 1986, Ser. No. 936,181

Int. Cl.[4] H01R *17/18*

U.S. Cl. 439—581 **7 Claims**



1. Electrical apparatus, comprising:

a frame with a first conductive material forming a first conductive path, said frame along said first conductive path having a first edge;

an insert with a contact surface and a second edge, said insert including a second conductive material continuous on and between said contact surface and said second edge;

said frame including means for holding said insert, said holding means including means for forming a seal between said first and second edges for preventing passage of gas between said first and second edges, thereby minimizing any oxidation of one of said first and second materials along said first and second edges;

a conductor including a spring forming a second conductive path; and

insulating means for supporting said conductor with respect to said frame, said spring having a contact portion extending from said insulating means to yieldably contact said contact surface of said insert;

whereby said first and second material may be different, said seal forming means maintaining high conductivity between said first and second material sat said first and second edges, said spring forming low contact resistance with said insert when said contact portion of said spring is yieldably contacting said contact surface of said insert.

4,710,139

ELECTRICAL JACK ASSEMBLY

Akihito Shichida, Osaka, Japan, assignor to Hosiden Electronics Co. Ltd., Osaka, Japan

Filed May 16, 1986, Ser. No. 864,041

Claims priority, application Japan, Nov. 8, 1985, 60-171906[U]

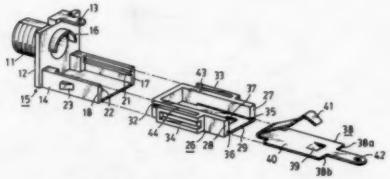
Int. Cl.[4] H01R *17/18*

U.S. Cl. 439—668 **9 Claims**

1. A plug comprising:

a single die cast body of conductive material which integrates a cylindrical portion having a through hole for receiving a plug, a flange at one end of the cylindrical portion, said cylindrical portion extending away from one face of said flange, a terminal extending outwardly of the flange, and a holding portion extending away from another face of the flange opposite to said one face, said holding portion of said die cast body having a pair of opposed side panels on both sides of the cylindrical portion of said die cast body, said side panels extending away from said flange along said holding portion and in parallel relation to said holding portion in a direction opposite to the direction of extension of the cylindrical portion;

a contact piece holder fabricated of an insulating material, said contact piece holder being fitted into said holding portion of said die cast body, in slidable engagement with



said side panels of said holding portion, from an open end of said holding portion remote from said cylindrical portion;

locking means between said holding portion of said die cast body and said contact piece holder for locking said holding portion to said contact piece holder as said contact piece holder is slidably fitted into said holding portion; and

a contact piece carried by said contact piece holder for making contact with a plug inserted into the cylindrical portion of said die cast body, the contact piece being fabricated of a conductive material and having a terminal integrally formed therewith.

4,710,140

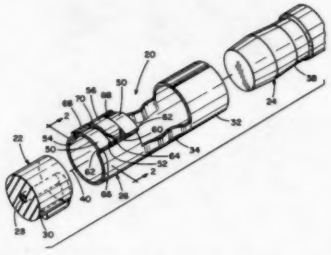
PLIERS CRIMPABLE TERMINAL

Lanny J. Frawley, St. Charles, Ill., assignor to Cooper Industries, Inc., Houston, Tex.

Filed Mar. 3, 1987, Ser. No. 21,165

Int. Cl.[4] H01R *13/415*

U.S. Cl. 439—733 **12 Claims**



1. A metallic terminal for use with a conductor having a conductive-core and a jacket of electrical insulation disposed about the core, said terminal comprising a deformable barrel for receiving said conductor, and a portion for contacting another electrical component, said barrel having an axis and comprising:

a channel having a first end and a second end with said ends extending generally parallel to said axis;

a first finger extending from said first end at least substantially across the opening of said channel and having a pointed distal end directed inside said channel;

first abutment means associated with said first end for engagement by one of the jaws of a pliers; and

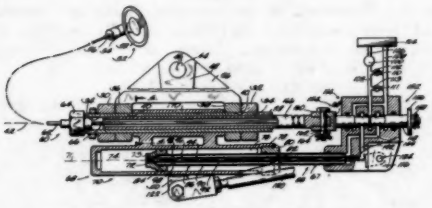
second abutment means associated with said second end for engagement by the other of the jaws of said pliers whereby after insertion of said conductor into said barrel with the core, from which a jacket portion was stripped, folded back over the jacket, closing tne jaws of the pliers results in the channel being deformed to compressively hold said conductor and said finger distal end piercing said jacket.

4,710,141

MARINE PROPULSION DEVICE POWER STEERING SYSTEM

Arthur R. Ferguson, Northbrook, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed May 29, 1984, Ser. No. 614,821
Int. Cl.[4] B63H *21/26*
U.S. Cl. 440—61 **40 Claims**



6. A marine propulsion device comprising a propulsion unit, mounting means adapted to be mounted on a boat and connected to said propulsion unit for affording pivotal steering movement of said propulsion unit in opposite directions about a steering axis and power assist means adapted to operably connect an actuator to said propulsion unit for increasing the steering force applied to said propulsion unit by the actuator, said power assist means being wholly supported on said mounting means and including a hydraulic cylinder piston assembly including a cylinder, a piston mounted in said cylinder for reciprocative movement therein and an extendable and retractable piston rod connected to said piston, and control means for selectively extending and retracting said piston rod, said control means having first and second members axially movable relative to each other, one of said members being adapted to be connected to the actuator for axial movement relative to the other of said members in response to movement of the actuator and said other member being connected to said piston rod for common movement therewith and connected to said propulsion unit for effecting steering movement of said propulsion unit in response to movement of said other member.

4,710,142

PROPELLER SHAFT BEARING ASSEMBLY

Roger Lovell, P.O. Drawer 760, Palacios, Tex. 77465

Filed Apr. 9, 1985, Ser. No. 721,433
Int. Cl.[4] B63H *23/34*
U.S. Cl. 440—83 **11 Claims**

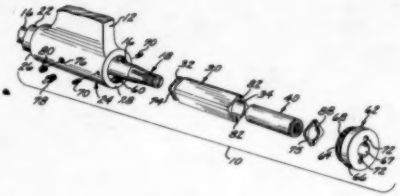
1. A bearing assembly for a boat propeller shaft which comprises:

an outer housing having front and rear ends adapted to be rigidly secured to the boat hull and having first bore means therethrough,

an inner housing removably axially slideably engagable in said outer housing bore means and having second bore means therethrough,

bearing sleeve means removably fixedly secured within said second bore means within which said propeller shaft is adapted to be journalled, and

front end rear apertured shoulder means on the ends of said outer housing for axially retaining said inner housing and bearing sleeve within said outer housing, said rear shoulder means being removably attached to said outer housing allowing for removal of said inner housing and bearing sleeve means from said outer housing, replacement of said bearing sleeve means in said inner housing, and then replacement of said inner housing and bearing sleeve means in said outer housing,



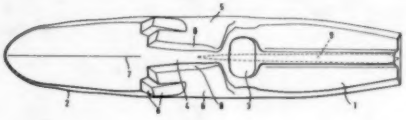
said first bore means and the outer periphery of said inner housing having complementary out-of-round cross-sectional configuration along their lengths preventing rotational movement of said inner housing and bearing sleeve means in said outer housing.

4,710,143

PADDLE-DRIVEN WATERCRAFT

Paul Boulanger, rue Vinave 131, Grivegnee-Liege, Belgium

Continuation of Ser. No. 761,570, Aug. 1, 1985, abandoned. This application Feb. 27, 1987, Ser. No. 21,542
Claims priority, application Belgium, Aug. 3, 1984, 6/47990
Int. Cl.[4] A63C *15/00*
U.S. Cl. 441—65 **2 Claims**



1. A paddle-driven watercraft comprising a single elongated closed shell formed with a hull constituting an underside of said shell and a deck constituting an upper surface of said shell, said shell defining a bow at a front end thereof, said hull and said deck being elongated in a direction of travel of said watercraft, said hull being formed with:

a downwardly open, rearwardly widening channel terminating at a stern of said shell and commencing at a location substantially midway of the length of said shell, and

said channel subdividing said hull between said location and said stern into two rearwardly extending hull sections separated by said channel,

said deck being formed with:

a seat-forming recess bounded toward the stern by a raised rim and open forwardly toward said bow,

a central dip immediately ahead of said seat-forming recess in the direction of said bow, p2 a central rise convexly curved upwardly from said dip forwardly to a level above said rim,

a forwardly and downwardly inclined slope from said rise to said bow,

a pair of laterally unconfined platforms upon which a user of the watercraft can kneel on opposite sides of said rise, and

a respective upwardly and forwardly inclined footrest at an end of each of said platforms proximal to said bow, said footrests being formed on opposite sides of said central rise, said seat-forming recess, said platforms and said footrests being constructed and arranged to preclude collection of water on said deck.

4,710,144

WATER SKIS AND THE LIKE

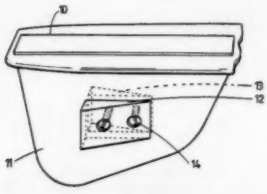
John Hunt, 2 Crackstone Cottage, Stroud Minchinhampton Gloucestershire, Great Britain

Filed Aug. 30, 1985, Ser. No. 771,555

Claims priority, application United Kingdom, Sep. 11, 1984, 8422952

Int. Cl.[4] B63H *5/06*

U.S. Cl. 441—79 7 Claims



1. Water ski equipment comprising a platform, a fin attached to the platform to project downwardly, in a position of use and means on the fin arranged to deflect water laterally of the direction of travel, in use, said means defining a pair of surfaces set at acute angles with respect to the plane of the fin and the front ends of such surfaces being nearer together than their rear ends, the surfaces being independently adjustable.

4,710,145

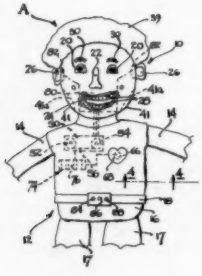
THERAPEUTIC DOLL FIGURE

Nancy Hall Vandis, 4730 Laurel Grove Ave., North Hollywood, Calif. 91607

Filed Dec. 27, 1984, Ser. No. 686,647

Int. Cl.[4] A63H *3/16, 3/28, 3/44*

U.S. Cl. 446—100 18 Claims



1. A therapeutic doll figure capable of receiving and recording speech of a person and generating speech of that person to simulate the presence of that person and capable of having the facial expression altered to represent known or unknown persons through the doll figure, said doll figure comprising:

(a) a doll body having a head section and a torso section, said head secton having a representation of a human face thereon including a representation of eyes, a representation of a mouth and a representation of a nose,

(b) a first means of attachment associated with and closely located with respect to the representation of a mouth and which enables attachment and removal of an element to enable alteration of facial appearance,

(c) a second means of attachment associated with and closely located with respect to the representations of eyes and which enables attachment and removal of an element to also enable alteration of facial appearance, and where the elements for attachment and removal enable the doll figure to represent a known or unknown human person,

(d) a transport having a recordable media on which a spoken message may be recorded and from which the message may be reporduced,

(e) read-write means associated with said transport for recording and reproducing the message from the recordable media,

(f) a speaker located in or on said doll figure and operatively connected to said transport and read-write means to reproduce the message of a person through the doll figure to simulate the presence of the person producing the message, and

(f) a microphone located in or on said doll figure and operatively connected to said transport and read-write means to enable a message to be recorded on said recordable media.

4,710,146

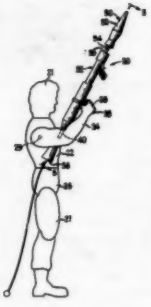
PROJECTILE PROPELLING ATTACHMENT FOR TOY FIGURES

Russell G. Rasmussen, Skokie; Leonard J. Stubenfoll, Chicago, and Harry Disko, South Barrington, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 6, 1986, Ser. No. 827,245

Int. Cl.[4] A63H *13/10, 33/30*

U.S. Cl. 446—308 9 Claims



1. A toy projectile propelling attachment comprising:

an apparatus including a barrel having a bore extending through the barrel;

spring biasing means contained within the barrel;

a projectile;

the barrel receiving and seating at least a portion of the projectile;

the tether having a forward end and a rearward end;

the forward end of the tether secured to the projectile; and

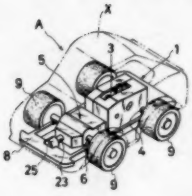
the rearward end of the tether extending through the apparatus so that pulling on the rearward end of the tether engages the biasing means with the projectile and releasing the tether propels the projectile completely outside the confines of the barrel vehicle while retaining the spring biasing means within the barrel.

4,710,147

FOUR-WHEEL DRIVE UNIT FOR TOY VEHICLE

Hiroshi Wakase, Tokyo, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed Jul. 1, 1986, Ser. No. 880,724
Claims priority, application Japan, Jul. 2, 1985, 60-100780[U]
Int. Cl.[4] A63H *29/00, 17/26*
U.S. Cl. 446—464 11 Claims



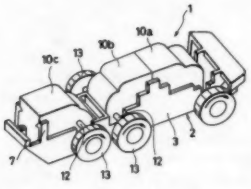
1. A four-wheel drive unit for a toy vehicle comprising:
a spring drive mechanism;
a link shaft rotatably connected to the spring drive mechanism;
a gear mechanism rotatably connected to the link shaft; and
means for rotating either the gear mechanism or the spring drive mechanism about the link shaft, the rotating means including a tubular projection and a support hole that provides an interface between the gear mechanism and spring drive mechanism, and further including a pivoting projection fixed to either the gear mechanism or the spring drive.

4,710,148

TOY VEHICLE ASSEMBLY WITH MULTIPLE DRIVE UNITS

Junichi Nagaoka, Misato, Japan, assignor to Takara Co., Ltd., Tokyo, Japan

Filed Oct. 21, 1986, Ser. No. 921,674
Claims priority, application Japan, Oct. 23, 1985, 60-162712[U]
Int. Cl.[4] A63H *29/00*
U.S. Cl. 446—464 6 Claims



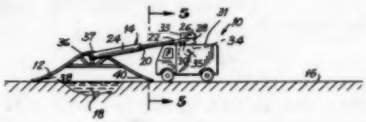
1. A combination chassis and multiple drive unit-assembly for a toy vehicle comprising;
a chassis member having a plurality of compartments; and
at least a pair of unitary drive units mounted respectively in a pair of compartments, each unitary drive unit includes a body member, a drive mechanism contained in the body member, a rotary shaft connected to the drive mechanism, and a pair of wheels connected to the rotary shaft, the rotary shaft extends on either side of the chassis member to position the respective wheels on the sides of the chassis member, for translation on a support surface, each compartment has means for removably retaining a unitary drive unit and each drive unit body member has complementary retention means for co-acting with the means for retaining whereby a user can selectively insert and remove the unitary drive units in the chassis member compartments.

4,710,149

TOY VEHICLE WITH SELF-CONTAINED BRIDGE

David Prusman, 138 Walgrove Ave., Dobbs Ferry, N.Y. 10522

Filed Mar. 21, 1986, Ser. No. 842,306
Int. Cl.[4] A47H *18/00*
U.S. Cl. 446—476 11 Claims



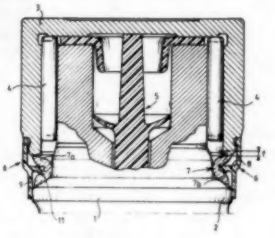
1. A vehicle with self-contained bridge comprising:
(a) a movable vehicle capable of traveling on a surface;
(b) a hazard spanning bridge secured to said vehicle by bridge connection means;
(c) said bridge having both a bridge operative position wherein said bridge is in front of the intended direction of movement of said vehicle and said bridge is supported directly on said surface, and a bridge and vehicle transport position wherein said bridge is behind the intended direction of movement of said vehicle and said bridge is suspended and held above said surface by said bridge connection means;
(d) said bridge, when in its bridge operative position, allowing said vehicle to pass thereover; and
(e) the passage of said vehicle over said bridge causes said bridge to change from said bridge operative position to said bridge and vehicle transport position.

4,710,150

SEALING DEVICE FOR A UNIVERSAL JOINT

Jacques Mangiavacchi, Chatou, France, assignor to Glaenzer Spicer, Poissy, France

Filed Jun. 12, 1985, Ser. No. 743,965
Claims priority, application France, Jun. 15, 1984, 84 09451
Int. Cl.[4] F16D *3/84*
U.S. Cl. 464—14 4 Claims



1. A sealing device for a universal joint comprising:
spider element branches, each of said spider element branches having an outer flange;
an annular cup, surrounding each of said spider element branches, having a circular inner flange extending radially inward from an inner surface thereof and having a skirt extending perpendicularly from said circular inner flange which caps said outer flange of a corresponding one of said spider element branches with a gripping effect;
a bearing ring capping an end of each of said spider element branches, said bearing ring being connected to said annular cup;
a flexible sealing element disposed around said corresponding spider element branch and providing a dynamic seal with said bearing ring, said flexible sealing element having an annular recess between a pair of lips, said circular inner

flange of said annular cup being received in said annular recess and engaged with said pair of lips of said flexible sealing element; and

means for fixing said flexible sealing element to said circular inner flange of said annular cup to prevent rotation of said flexible sealing element with respect to said annular cup;

whereby said gripping effect exerted by said skirt results in a reduction in deflection and deformation of said flexible sealing element.

4,710,151

SYSTEM FOR CONTROLLING THE PRESSURE OF OIL IN A SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

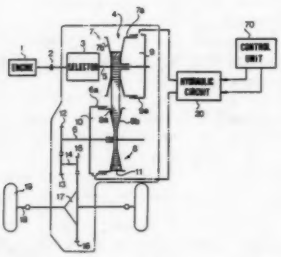
Yasuhito Sakai, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1986, Ser. No. 879,650

Claims priority, application Japan, Jun. 29, 1985, 60-143473

Int. Cl.[4] F16H *11/04*

U.S. Cl. 474—28 **9 Claims**



1. In a control system for a continuously variable transmission for transmitting power of an internal combustion engine, the system comprising a drive pulley having a hydraulically shiftable disc and a first hydraulic cylinder for shifting the disc, a driven pulley having a hydraulically shiftable disc and a second hydraulic cylinder for operating the disc of the driven pulley, a belt engaged with both pulleys, a line pressure control valve having ports and a spool and provided for supplying line pressure, a transmission ratio control valve having ports and a spool, a first hydraulic circuit having a pump for supplying oil to the first hydraulic cylinder through the line pressure control valve and the transmission ratio control valve, wherein the improvement comprises:

first means for applying a first pressure to adjacent a first end of at least one of the spools of the control valves for urging said at least one spool in one direction;

second means for applying a second pressure to adjacent a second end of the at least one spool of the control valves so as to shift said at least one spool in the other direction;

a pressure reducing valve communicated with the first hydraulic circuit for supplying a constant basic pressure of the oil lower than the line pressure;

a second hydraulic circuit communicated with the pressure reducing valve for applying the basic pressure of the oil to adjacent at least one of the first and second ends of said at least one spool so as to apply the basic pressure to said at least one spool;

control valve means provided in the second hydraulic circuit to control the basic pressure so as to apply the basic pressure to adjacent at least one of the first and second ends of said at least one spool as a control pressure; and

means for controlling the control valve means so as to control the control pressure in accordance with operating conditions of the engine.

4,710,152

CRANK DAMPER PULLEY STRUCTURE FOR THE INTERNAL COMBUSTION ENGINE OF A CAR

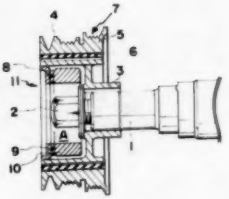
Noriyuki Ichikawa; Tetsushi Suzuki, and Tomiaki Atsumi, all of Shizuoka, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

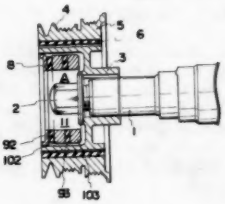
Filed Mar. 12, 1986, Ser. No. 838,940

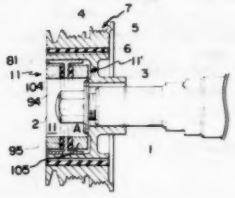
Claims priority, application Japan, Mar. 13, 1985, 60-048300

Int. Cl.[4] F16F *15/12*; F16H *55/36*

U.S. Cl. 474—166 **16 Claims**







1. In a crank damper pulley structure for an internal combustion engine having a crank shaft to the tip of which is fixed a pulley hub having a generally circular coaxial cavity in one end thereof, the improvement comprising:

a damper support fixed to the interior peripheral surface of said cavity and having a flange extending radially inward at a substantially right angle to the hub axis; and

a ring-like damper rubber fixed coaxially to one end of a ring-like damper mass, both comprising a dynamic damper, disposed coaxially in said cavity with said rubber fixed to said flange.

4,710,153

LINK CHAIN

Kurt Allert, Panoramaweg 3, D-7238 Oberndorf, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 866,064

Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3518160

Int. Cl.[4] F16G *13/07*

U.S. Cl. 474—211 **27 Claims**

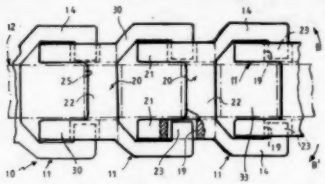
1. An elongated link chain comprising a plurality of hingedly connected chain links,

each chain link being made of punched out sheet metal defining a first plane, and comprising

two lateral walls extending in the longitudinal direction of the chain and spaced from one another in a direction transverse to said longitudinal direction,

at least one transverse web in said first plane and rigidly interconnecting said lateral walls for holding said walls in position with respect to one another,

each lateral wall including an arm, each arm having an end portion constituting a bearing pin, said bearing pins being bent so that the end portions extend in a direction transverse to said longitudinal direction, at least parts of respective of said end portions extending in a direction approximately parallel to that of said transverse web,



each of said lateral walls having a separate bearing hole punched-out in said sheet metal for receiving the respective associated bearing pin of another identical chain link which is arranged adjacently to said bearing holes, said separate bearing holes being made coaxial with one another by bending said lateral walls in a direction approxiamtely at right angles to said first plane, so as to extend in a second plane, and to constitute an approximately U-shaped bracket with said transverse web, and so that the bearing holes are spaced at an axial distance from one another,

said bearing holes defining a first axis, and said parts of respective of said end portions of said bearing pins defining a second axis, said axes being parallel to one another.

4,710,154

PLATE LINK CHAIN FOR CONE PULLEY DRIVES

Manfred Rattunde, Bad Homburg, Fed. Rep. of Germany, assignor to Reimers Getriebe AG, Ch-zug, Switzerland

Filed Jun. 24, 1986, Ser. No. 877,938

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1985, 3526062

Int. Cl.[4] F16G *1/24*

U.S. Cl. 474—242 **13 Claims**

1. A plate-link chain for infinitely adjustable friction disks cone pulley drives, including hardened pivot link elements (**2, 10, 11, 16, 17**) joining individual chain links (**1, 7, 19**) by insertion of said hardened pivot link through recesses (**4**) therein in an assembled plate-link chain in which said pivot link elements have end faces (**3**) that transmit frictional forces between said friction disks cone pulley drives and said pivot link elements, said pivot link elements are inserted into recesses (**4**) in said chain links with the pivot link elements with at least one contacting part of their profile in pivot contact with said plate recesses and said hardened pivot link elements are secured within said recesses by at least one non-removable securing element against escaping sideways out of said plate recesses, said at least one non-removable securing element being a metal piece (**5, 6, 12–15, 21–24, 37, 38, 39, 48, 49**) secured in contour forming contact by means of energy beam welding with a portion of an outer surface of each of said pivot link elements with said securing elements secured to said pivot links outwardly of said chain links.

4,710,155

BELT

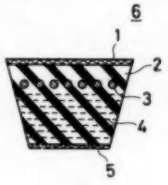
Hiroshi Matsuoka, Izumi, and Susumu Onoe, Osaka, both of Japan, assignors to Bando Chemical Industries, Lt., Hyogo, Japan

Filed Apr. 26, 1985, Ser. No. 727,862

Claims priority, application Japan, Apr. 26, 1984, 59-85953

Int. Cl.[4] F16G *5/06*

U.S. Cl. 474—260 **7 Claims**



1. A transmission-type belt characterized in its ability to resist flexure, comprising a tension section, a compression section and load carriers disposed between said two sections composed of polyethyleneterephthalate filament of which at least 85 mol % ethyleneterephthalate is a repeated unit, said filament being at least 0.8 in ultimate viscosity, less than 0.190 in bifringence rate, less than 60 in the degree of orientation of its amorphous portion and less than 15 equivalent/10^6 g in terminal carboxyl group content.

6. A method of fabricating a transmission-type belt characterized in that it can resist flexure, comprising the steps of:

(a) treating raw cords composed of polyethyleneneterephthalate filament which has at least 85 mol % ethyleneterephthalate as repeated unit and is at least 0.8 in ultimate viscosity, less than 0.190 in bifringence rate, less than 60 in the degree of orientation of amorphous portion and less than 15 equivalent 10^6 g in terminal carboxyl group content, said treatment including dry heat for 30 minutes at 150° C. after an adhesive treatment and a heat treatment whereby load carriers are fabricated having less than 5% in shrinkage percentage, at least 6 g/denier in strength and less than 4% in elongation at a load of 2 g/denier,

(b) disposing between tension and compression sections of a rubber matrix, load carriers, and

(c) vulcanizing said rubber matrix containing said load carriers.

4,710,156

SHEET PROCESSING APPARATUS

Franz Vossen, Radolfzell, Fed. Rep. of Germany, assignor to Meurer Druck & Carton GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 426,904, Sep. 29, 1982, Pat. No. 4,544,367. This application Jun. 21, 1985, Ser. No. 747,456

Int. Cl.[4] B31B *1/00*

U.S. Cl. 493—1 **15 Claims**

1. Apparatus for processing a sheet of material such as sheets of cardboard for the manufacture of folding boxes or the like comprising:

a table plate;

a stamping plate having die means for forming bend lines fixed to said table plate;

said stamping plate carrying a cardboard plate on an upper surface above said die means;

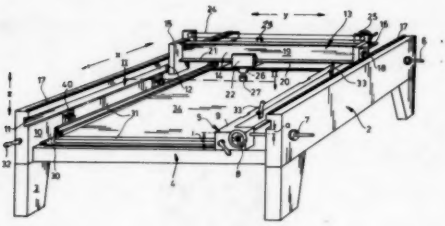
a chase structure movable relative to said stamping plate;

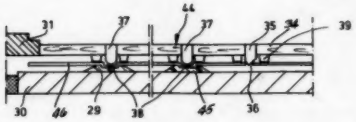
means for defining a folding box pattern including cut lines and bend lines;

said pattern defining means being surrounded by said chase structure and carrying at least one member for forming said bend lines and at least one tool for forming said cut lines;

a beam member extending over the table plate at a spacing therefrom and disposed movably thereabove.

a carriage movable in a direction transverse with respect to the direction of movement of said beam member;





at least one vertically movable pressure member carried on said carriage; and

each said pressure member comprising a ram head operatively directed towards said pattern defining means and said die means whereby pressure is applied against said pattern defining means so that said defining means can press said plate against said die means for producing said cut lines and said bend lines on said cardboard plate.

4,710,157

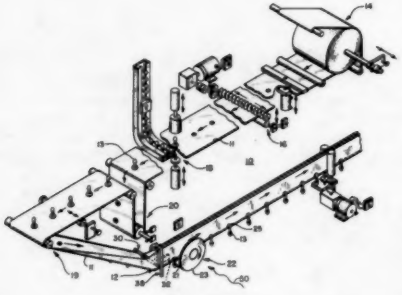
FORMER FOR FORM, FILL AND SEAL PACKAGING MACHINE

John Posey, McHenry, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 697,542, Feb. 1, 1985, abandoned. This application Aug. 25, 1986, Ser. No. 902,038

Int. Cl.[4] B31B *23/36, 23/90*

U.S. Cl. 493—213 **16 Claims**



6. An apparatus for producing from a web of flexible film flexible pouches having a fitment located at one end comprising:

means for attaching a fitment to the film;

means for feeding the film with attached fitment to a former;

the former including means for aligning opposite longitudinal portions of the film;

the means for aligning opposite longitudinal portions including a substantially V-shaped member, an elongated member secured to the V-shaped member, support means for supporting the V-shaped member and elongated member, and means for maintaining the film with aligned opposite longitudinal portions;

the elongated member of the former including means for heating the fitments;

a base former for forming the base of the fitment attached to the web of film so that the base takes on a substantially curved shape, the base former being located downstream of the former; and

means for feeding the film from the former to the base former.

4,710,158

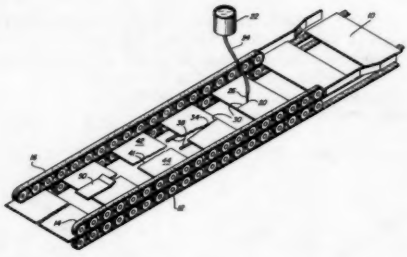
METHOD AND APPARATUS FOR PRODUCING DECKLED EDGE PAPER

Randall S. Knipp, Kansas City, and Lewis Loyd, Independence, both of Mo., assignors to Hallmark Cards, Incorporated, Kansas City, Mo.

Continuation of Ser. No. 832,530, Feb. 24, 1986, abandoned. This application Apr. 24, 1987, Ser. No. 42,515

Int. Cl.[4] B26F *3/02*

U.S. Cl. 493—328 **18 Claims**



1. A process for producing a deckle edge on greeting card or stationery paper which comprises:

(a) depositing a web of paper stock adapted for greeting card or stationery use into conveyor means,

(b) maintaining the said web of paper stock on the conveyor means in a taut and substantially flat condition,

(c) applying a stream of liquid to said paper stock to form a wetted line of desired width thereon along a predetermined path,

(d) transporting said wetted paper stock to a splitting operation,

(e) exerting a shearing force on the wetted paper stock sufficient to cause the paper stock to split into two parts in a direction along the wetted line thereby producing a deckle edge on both separated parts of the paper, and

(f) removing moisture from the separated parts of the paper stock to set the paper fibers.

4,710,159

CENTRIFUGAL SEPARATOR

Per Gullers, Södertälje, Sweden, assignor to Alfa-Laval Separation AB, Tumba, Sweden

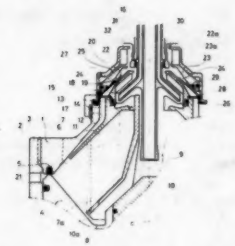
PCT No. PCT/SE85/00326, § 371 Date Jun. 2, 1986, § 102(e) Date Jun. 2, 1986, PCT Pub. No. WO86/02021, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 2, 1985, Ser. No. 876,873

Claims priority, application Sweden, Oct. 8, 1984, 8405015

Int. Cl.[4] B04B *11/00*

U.S. Cl. 494—27 **5 Claims**



1. In a centrifugal separator including a rotor having an inlet (9) for a mixture of components to be separated, a first central outlet (12, 15) for a separated light liquid component, a second central outlet (20, 26) for a separated heavy liquid component, and a peripheral outlet (21), and means (4) for opening said peripheral outlet intermittently during operation of the rotor, said second central outlet having a first overflow outlet (20) positioned to maintain a free liquid surface of the separated heavy liquid component at a predetermined level in the rotor, the improvement comprising an axially movable slide (23) movable to open and close said second central outlet (20, 26) for the separated heavy liquid component, and means forming a second overflow outlet (*22a*) located radially inside said predetermined level in position to allow discharge of separated heavy liquid component from the rotor when said slide (23) is in its closing position.

4,710,160

CENTRIFUGAL SEPARATOR

Kjell Klintenstedt, Nacka; Zoltan Földhazy, Tumba, both of Sweden, and Björn Forsberg, Hörsholm, Denmark, assignors to Alfa-Laval AB, Tumba, Sweden

PCT No. PCT/SE85/00249, § 371 Date Jan. 15, 1986, § 102(e) Date Jan. 15, 1986, PCT Pub. No. WO86/00029, PCT Pub. Date Jan. 3, 1986

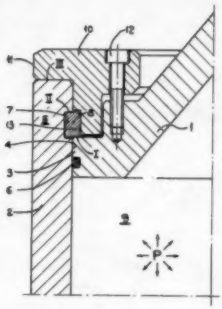
PCT Filed Jun. 13, 1985, Ser. No. 844,387

Claims priority, application Sweden, Jun. 14, 1984, 8403182

Int. Cl.[4] B04B *15/06*

U.S. Cl. 494—64 **7 Claims**

1. Centrifugal separator comprising a first and a second rotor part (1, 2), which together surround a separation chamber (9), an annular flange portion (3) of the first rotor part (1) being axially inserted into a sleeve formed end portion (5) of the second rotor part (2) and connected thereto by means of a locking joint comprising at least one locking member (8), which from a position radially inside said sleeve formed end portion (5) and axially outside said annular flange portion (3) has been moved radially outwards, so that part of the locking member (8) is located in an internal recess (7) in the sleeve formed end portion (5), while the remaining part of the locking member (8) is located radially inside the periphery of said flange portion (3), whereby the locking member (8) is arranged to transmit to said second rotor part (2) axial forces arising during operation of the rotor and acting against the inside of said first rotor part (1), characterized in that said locking joint also comprises a circular pre-stressing element (10), which has a radially outer portion (11) abutting against an essentially axially facing surface of said sleeve formed end portion (5), preferably against its end surface, and which is arranged by means of a prestressing member (12) to be connected with the



first rotor part (1) and to prestress it axially via a locking element (8) against the second rotor part (2).

4,710,161

CONTINUOUS TYPE CENTRIFUGAL SEPARATOR

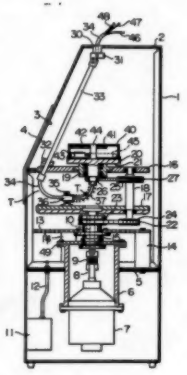
Kuniaki Takabayashi, Higashiosaka; Yoshitsugu Takaoka, Nara; Kouichi Hori, Hirakata; Masaki Shimotakahara, Katano; Kikujiro Okada, Ikoma, and Satoru Shiino, Uji, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed Apr. 21, 1986, Ser. No. 853,921

Claims priority, application Japan, Apr. 22, 1985, 60-85923

Int. Cl.[4] B04B *9/02*

U.S. Cl. 494—84 **10 Claims**



1. A continuous type centrifugal separator comprising:

rotary means rotating around a predetermined axis;

connection means rotatably provided on said rotary means, the rotary axis of said connection means being in parallel with said predetermined axis and being deviated from said predetermined axis in a direction perpendicular to said predetermined axis;

centrifugal separation means rotatably provided coaxially with said predetermined axis;

supply/discharge means, one end of said supply/discharge means being connected to said centrifugal separation means, said supply/discharge means extending therefrom to a predetermined position of said rotary means and at the predetermined position being rotatably held on said rotary means and the other end extending outside of said separator, passing on said predetermined axis; and

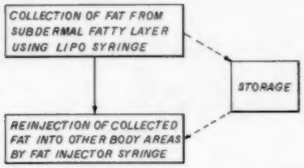
rotary driving mechanism means including means for rotating said connection means around said predetermined axis and rotating said connection means on its own axis, and means for rotating said centrifugal separation means at the half speed of said rotary means by the rotations of said connection means.

4,710,162

FAT COLLECTION AND INJECTION PROCESS INTO SAME BODY

Gerald W. Johnson, 17070 Red Oak, Suite 301, Houston, Tex. 77090

Filed Oct. 31, 1986, Ser. No. 925,443
Int. Cl.[4] A61M *31/00*
U.S. Cl. 604—51 **24 Claims**


COLLECTION OF FAT FROM SUBDERMAL FATTY LAYER USING LIPO SYRINGE
STORAGE
REINJECTION OF COLLECTED FAT INTO OTHER BODY AREAS BY FAT INJECTOR SYRINGE

1. A method of reconstructing human body surface configurations comprises the steps of

providing a vacuum-operated collection syringe having a barrel, plunger and needle,

injecting said collection needle into a subdermal fatty layer of a human body,

applying sufficient vacuum to said syringe to withdraw fatty material from said subdermal fatty layer while withdrawing said plunger in said barrel,

providing an injection syringe having a barrel, plunger and needle,

supplying said withdrawn fatty material from said collection syringe to said injection syringe,

inserting said injection needle into another area of the same body from which said fatty material was withdrawn, and

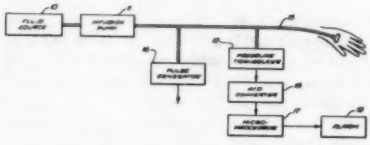
operating said injection syringe by withdrawing said needle and barrel relative to said plunger to inject said fatty material in a controlled distribution.

4,710,163

DETECTION OF FLUID FLOW FAULTS IN THE PARENTERAL ADMINISTRATION OF FLUIDS

Robert D. Butterfield, San Diego, Calif., assignor to Ivac Corporation, San Diego, Calif.

Filed Jun. 6, 1986, Ser. No. 872,086
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—65 **20 Claims**



1. A system for monitoring the flow of parenteral fluid through a parenteral fluid delivery system to a patient wherein the fluid in the delivery system is at a base level of pressure or flow rate, the system comprising:

(a) means to apply to fluid in the fluid delivery system a fluid flow excitation pulse which is at a pressure or flow rate significantly greater or lesser than the base level of pressure or flow rate of fluid therein;

(b) means to sense the pressure response of fluid in the delivery system to the applied excitation pulse and generate a signal representing the response or characteristic thereof;

(c) means to generate a reference signal representing a pressure response or characteristic thereof of fluid in the delivery system to a fluid flow excitation pulse of a magnitude and duration equivalent to the fluid flow excitation pulse applied in (a) above when fault-free fluid flow conditions into the patient exist;

(d) means to compare the signal representing the sensed pressure response or characteristic thereof with the signal representing the reference pressure response or characteristic thereof to detect a difference therebetween; and

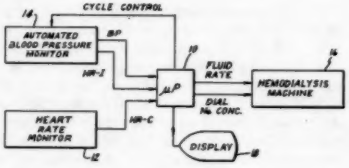
(e) means responsive to the difference to generate an alarm signal.

4,710,164

AUTOMATED HEMODIALYSIS CONTROL BASED UPON PATIENT BLOOD PRESSURE AND HEART RATE

Nathan W. Levin, Birmingham, and Gerard A. Zasuwa, Redford, both of Mich., assignors to Henry Ford Hospital, Detroit, Mich.

Filed May 1, 1984, Ser. No. 605,776
Int. Cl.[4] A61M *31/00*
U.S. Cl. 604—66 **13 Claims**



1. A system for controlled patient hemodialysis comprising

hemodialysis means including means for establishing circulation of dialysate and patient blood across opposite sides of an ultrafiltration membrane, means for establishing a goal rate of extraction of fluids from the patient through said membrane and means for controlling concentration of sodium in said dialysate,

means responsive to a cycle control signal for periodically reading patient blood pressure, means responsive to patient blood pressure for storing an initial blood pressure level at the onset of hemodialysis, and means responsive to deviation of patient blood pressure from said initial level by more than a first preselected deviation limit to provide a first alarm signal,

means for continuously monitoring patient heart rate, means for storing an initial heart rate level at the onset of hemodialysis, and means for providing a second alarm signal when patient heart rate deviates from said initial heart rate level by more than a second preselected deviation limit, and

means responsive to both said first and second alarm signals for automatically controlling said cycle control signal so as to increase the frequency of reading patient blood pressure in response to alarm deviation of patient heart rate or blood pressure or both.

4,710,165

WEARABLE, VARIABLE RATE SUCTION/COLLECTION DEVICE

Charles B. McNeil, 5960 Arbour Ave., Edina, Minn. 55436, and Thomas J. McEvoy, 13103 Baker Trail, Minnetonka, Minn. 55343

Filed Sep. 16, 1985, Ser. No. 776,633
Int. Cl.[4] A61M *5/14*
U.S. Cl. 604—67 **27 Claims**

1. A wearable, variable vacuum level suction and collection

device for the withdrawal and collection of fluid from a patient, said device comprising:

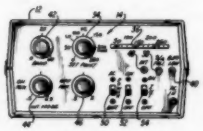
at least one collection receptacle including at least one patient inlet for connection to the patient, a further, suction inlet and an outlet for emptying the receptacle;

pump means, including a pump connection to said suction inlet, for creating suction within said collection receptacle so that fluids from the patient are drawn into the collection receptacle;

a bacterial filter, interposed between the pump and the collection receptacle, for filtering air drawn into the suction inlet;

venting means interposed between the pump and bacterial filter for venting the device;

a pump motor for driving said pump;



a battery powered power supply for said pump motor;

a transducer for sensing the suction created;

suction level selector means for permitting an operator to select a given suction pressure within a predetermined range; and

a control circuit, responsive to the transducer and to said suction level selector means, for controlling the suction created within the receptacle over said predetermined range; said control circuit including means for providing a selected suction pressure dead band on both sides of the selected suction pressure which defines an upper pressure limit above which the pump motor is de-energized and a lower pressure limit below which the pump motor is re-energized.

4,710,166

AUTOMATED DRUG ADDITIVE INFUSION SYSTEM

Thomas C. Thompson, McKinney, and David J. Harrison, Carrollton, both of Tex., assignors to Quest Medical, Inc., Carrollton, Tex.

Filed Nov. 8, 1985, Ser. No. 796,108
Int. Cl.[4] A61M *5/14*
U.S. Cl. 604—81 **6 Claims**

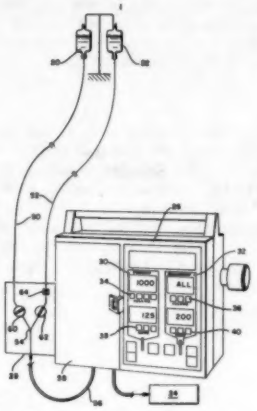
1. A system for administering to a patient fluid from a secondary fluid container at a selected secondary flow rate, followed by fluid from a primary fluid container at a selected primary flow rate, in which the rates are governed at a rate control site by an electromechanical device, the system comprising:

a Y-connector upstream from the rate control site;

a primary fluid tube extending from the primary fluid container to the Y-connector through a primary valve; a secondary fluid tube extending from the secondary fluid container to the Y-connector through a secondary valve;

an output flow tube extending from the Y-connector toward the patient whereby a primary fluid path is provided from the primary container to the device through the primary fluid tube, Y-connector and output flow tube, and a secondary fluid path is provided from the secondary container to the device through the secondary fluid tube, Y-connector and output flow tube;

detection means for automatically detecting the absence of fluid at a location in the secondary fluid path near the Y-connector, said location being selected so that no fluid holding means other than tubing is interposed in the secondary fluid path below the detection means and above the Y-connector; and



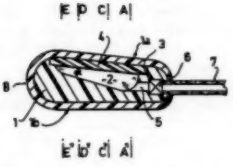
switching means responsive to detection by the detection means to close the secondary valve and open the primary valve, and thereafter cause the device to govern flow at the rate selected for the primary fluid.

4,710,167

IMPLANTABLE DEVICE FOR CHRONICALLY INJECTING A SUBSTANCE, IN PARTICULAR A THERAPEUTANT

Guy Lazorthes, Toulouse, France, assignor to Applied Precision Limited, London, England

Filed May 21, 1986, Ser. No. 865,412
Claims priority, application France, May 21, 1985, 85 08067
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—93 **9 Claims**



1. A device for subcutaneous implantation in an accessible zone for forming a site for perfusion or chronic injection of a liquid comprising

a unitary body having a thickness less than its width and breadth and having an upper, active face and a lower face profiled so as to permit said body to slide into said zone,

said body having a rounded concave recess therewith with a continuous concave bottom and being open at upper face and having a depth less than the width and breadth of said recess at said upper face,

duct means extending through said body from the bottom of said recess to the outside of said body on one side of said body,

flexible catheter means secured to said duct means so as to extend said duct outside of said body,

said body having a peripheral rim around said recess and a substantially planar flexible membrane sealingly secured to said rim and closing said recess, said membrane being self-sealing whereby said membrane may be pierced by a needle for filling said recess and said membrane may be deformed by pressure so as to substantially conform to the shape of said recess for expelling liquid therefrom;

said body being tapered toward said catheter means and said membrane being positioned on said body in an inclined position with respect to said lower face said recess bottom being angled downwardly toward the duct means, and being connected at its proximal end to the distal end of said exit tube and connected at its distal end to the proximal end of said bladder tube, said tube being constructed of a pliant material and having fibers therein, said tube being normally collapsed within the urethra but radially distended by a flow of urine through the bore, said interior bore being closed when said tube is collapsed and open when said tube is radially distended, the interior bore of said urethral tube being cooperatively connected with the interior bores of said exit tube and said bladder tube to form a drainage channel; and

an external seal disposed in sealing engagement about a portion of the periphery of said exit tube outside of the body and in conforming, sealed engagement with the exterior anatomy, said seal forming a pocket about the exterior anatomy when said catheter is positioned in place, said seal including accordian folds disposed between the respective points of engagement of said seal with said exit tube and said anatomy, said folds being extensible and distensible in response to movement of said exit tube, said seal including an injection port providing fluid access to said pocket.

4,710,168

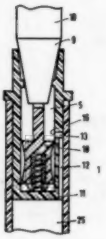
NON-RETURN VALVE FOR MEDICAL PURPOSES IN PARTICULAR FOR BALLOON CATHETERS

Egon Schwab, Otto-Schwabe Strasse 4, 6203 Hochheim, and Steve Padar, Theresen Strasse 17, 6235 Kelkheim, both of Fed. Rep. of Germany

Continuation of Ser. No. 726,071, Apr. 19, 1985. This application May 13, 1986, Ser. No. 865,907

Int. Cl.[4] A61M *25/00*; F16K *15/14*

U.S. Cl. 604—99 **10 Claims**



1. In a non-return valve suitable for medical purposes comprising a hollow valve housing having an opening to receive the mouthpiece of a syringe, said housing having a first abutment at its syringe-receiving end and a second abutment at its opposite end to thereby contain a valve closure member; a reciprocal, valve closure member disposed within the valve housing and displaceable by a syringe, the improvement which comprises a valve housing having a first slight abutment disposed inwardly of the interior wall of the housing so as to facilitate entry disposing of the valve closure member within the housing, a slidable valve-closure member having a peripheral surface in constant contact with the interior wall of the valve housing when the valve is in open or closed position; and an opening in the interior wall of the valve housing which communicates with an opening in the syringe mouthpiece through axial displacement of the valve closure member past the opening in the interior wall of the housing.

4,710,169

URINARY CATHETER WITH COLLAPSIBLE URETHRAL TUBE

T. Graham Christopher, 8727 Talbot Rd., Edmonds, Wash. 98020

Continuation-in-part of Ser. No. 562,094, Dec. 16, 1983, Pat. No. 4,571,241. This application Dec. 11, 1985, Ser. No. 805,546

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—104 **2 Claims**

1. A urinary catheter comprising:

a noncollapsible exit tube, said exit tube having an internal bore and being of sufficient length to extend through a portion of the urethra and out of the body from a position spaced inward from the urethral exit;

a noncollapsible bladder tube, said bladder tube having an interior bore and being of sufficient length to extend into the bladder from the area adjacent the bladder neck;

a urethral tube having an interior bore, said urethral tube

4,710,170

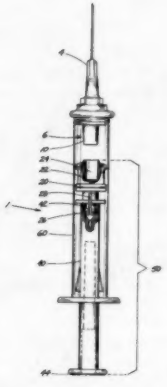
ANTI-NEEDLE STRIKE AND ANTI-DRUG ABUSE SYRINGE

Terry M. Haber, Lake Forest; William H. Smedley, Lake Elsinore, and Clark B. Foster, El Toro, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.

Filed Feb. 12, 1987, Ser. No. 14,270

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—110 **21 Claims**



1. An anti-needle strike and anti-drug abuse syringe comprising a hollow syringe cylinder, a hypodermic needle, means for carrying said hypodermic needle to be connected to said needle and removably attached to a first end of said syringe cylinder such that said hypodermic needle projects outwardly from

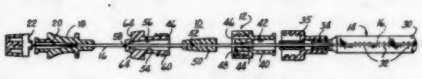
said first end by which to inject or infuse a fluid, means to relocate said needle carrying means from said first cylindrical end to another location within said cylinder such that said hypodermic needle extends within the interior of said syringe cylinder from said other location, and means to be inserted through said first cylinder end after the removal of said needle carrying means therefrom, said means to be inserted extending into the interior of said cylinder to prevent access to or reuse of said needle after fluid has been injected from said cylinder.

4,710,171

NEEDLE DEPTH SETTING SHEATH ASSEMBLY AND NEEDLE STOP

Helmut W. G. Rosenberg, McHenry, Ill., assignor to The Kendall Company, Boston, Mass.

Filed Jun. 9, 1986, Ser. No. 872,352
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—117 **4 Claims**



1. A biological needle assembly having a depth setting and stop arrangement thereon, comprising:

an elongated needle;

a connector means at the proximal end of the needle;

a needle stop assembly arranged with the connector at the proximal end of a needle; and

a sheath assembly having graduations thereon to effectuate the proper depth setting of said needle with respect thereto;

said needle stop assembly comprising a threadably adjustable compressive arrangement which locks said needle thereto, which includes a radially inwardly directed gripping means which can be tightened and untightened to permit the passage of the needle therethrough, comprising a hub and a housing which are coaxially arranged about a centrally disposed needle, and a centrally disposed bushing arranged therebetween, said bushing being receivable within said housing and engagable against one end of a portion of said hub.

4,710,172

HIGH PRESSURE SYRINGE WITH PRESSURE INDICATOR

John Jacklich, 102 Western Ct., Santa Cruz, Calif. 95060, and George Mikula, Bozeman, Mont., assignors to John Jacklich, Santa Cruz, Calif.

Filed Nov. 24, 1986, Ser. No. 934,434
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—118 **10 Claims**

1. In a syringe capable of delivering anesthetic under high pressure for use in procedures such as intraligamentary anesthesia, wherein said syringe has a barrel for holding an anesthetic carpule, said carpule having a bung at a first end of the carpule which may be driven toward the second end of the carpule, the second end having a diaphragm which is adapted to be pierced by one end of a double cannula, a piston rod for actuating the carpule bung, and a drive mechanism for advancing said piston rod to express the anesthetic from said carpule, the improvement comprising:

a. elongated stem means slidably mounted within a passageway formed in said piston rod,

b. head means carried at one end of said elongated stem means, said head means adapted to engage the bung of said carpule,

c. spring means located between said head means and said piston rod, and

d. indicator means actuated by relative motion between said elongated stem means and said piston rod, whereby the

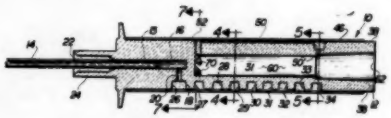
pressure being applied to said anesthetic is displayed for use by the operator of said syringe.

4,710,173

FLASHBACK STRUCTURE

Richard H. McFarlane, 2571 Kaneville Rd., Geneva, Ill. 60134

Filed Mar. 24, 1986, Ser. No. 843,493
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—168 **15 Claims**



1. A flashback structure of the type used to determine proper placement of a needle tip within a blood vessel, such as when placement of a catheter assembly within the blood vessel is being attempted, said structure comprising:

(a) a base having an elongated configuration and an outer surface comprising a substantially elongated cylindrical configuration and including a needle extending outwardly from one end of said base, said needle terminating in a sharpened tip at a distal end thereof,

(b) said needle comprising a hollow interior portion extending along the length thereof from said tip to a proximal end of said needle, said proximal end secured on the interior of said base, whereby blood travels along said needle into said base when said tip is located within said blood vessel,

(c) a flow channel integrally formed on said outer cylindrical surface of said base and disposed in fluid communication with said needle at substantially one end of said base and a vent means at the opposite end of said flow channel relative to said needle,

(d) said vent means formed on said cylindrical outer surface of said base for the exiting of air from said flow channel as blood enters therein from said needle,

(e) said flow channel comprising a groove structure extending along at least a portion of the length of said base and comprising a plurality of groove segments,

(f) said plurality of groove segments integrally formed in said cylindrical outer surface in spaced relation to one another and collectively extending between and in fluid communication with said proximal end of said needle and said vent means,

(g) each of said groove segments comprising a curvilinear configuration disposed transversely to the length of said base in at least partially surrounding relation thereto and extending into said base a sufficient depth to allow a free flow of blood therealong, and

(h) cover means being at least partially transparent and mounted in engaging and surrounding relation to said cylindrical outer surface of said base and in covering, fluid retaining relation to said plurality of groove segments and said vent means,

(i) whereby blood is viewable as it flows from said needle along the length of said flow channel beneath said cover means when said tip is properly positioned within a blood vessel.

4,710,174

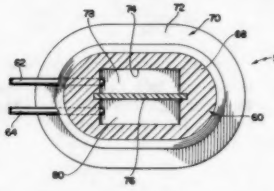
IMPLANTABLE INFUSION PORT

James R. Moden, Bristol; Michael D. Caldwell, East Greenwich, and Robert D. Moden, Barrington, all of R.I., assignors to Surgical Engineering Associates, Inc., Bristol, R.I.

Filed Dec. 16, 1985, Ser. No. 809,773

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—175 **8 Claims**



1. An implantable infusion port for dispensing medication in the body of a patient comprising a septum having a base portion, a side wall portion and a top wall portion which cooperate to define an enclosed cavity in said septum, at least a portion of said side wall portion being made of a material which is penetrable by a hypodermic needle or the like for introducing medication into said cavity but which is substantially selfsealing upon removal of said needle therefrom, catheter means providing communication between said cavity and the exterior of said septum for dispensing said medication in the body of said patient, and impenetrable means within said port extending substantially upright relative to said base portion and operable for limiting the extent of penetration of said needle in said port in a direction substantially parallel to said base portion.

4,710,175

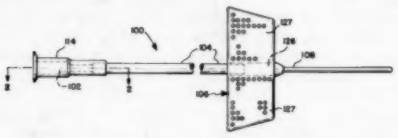
INTRAVENOUS INFUSION ASSEMBLY FORMED AS AN INTEGRAL PART

Robert L. Cartmell, Kettering; Charles W. Daugherty, Xenia, and David B. Ireland, Dayton, all of Ohio, assignors to Deseret Medical, Inc., Franklin Lakes, N.J.

Continuation of Ser. No. 524,728, Aug. 19, 1983, abandoned. This application Feb. 12, 1986, Ser. No. 829,457

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—177 **1 Claim**



1. A unitary winged catheter assembly comprised entirely of a plurality of polyurethane parts of varying degrees of hardness, said parts being dielectrically welded together into said unitary assembly, characterized by

(a) a fluid receiving hub for said assembly;

(b) said hub having a fluid receiving first end and a second end;

(c) said hub being comprised of a substantially hard rigid polyurethane material having a Shore D hardness within the range of between about 50 and 75;

(d) a fluid canal in said hub, said canal extending from said first end to said second end;

(e) said canal having a reduced diameter portion adjacent said second end to define a tubing stop in said hub canal;

(f) a length of substantially soft flexible polyurethane tubing having a Shore A hardness within the range of between about 75 and [illegible], said tubing having a first end and a second end;

(g) the first end of said tubing extending into said second end of said hub to said tubing stop and forming a first joint for said assembly;

(h) said first end of said tubing and said second end of said hub having internal diameters substantially equal at said tubing stop;

(i) a gripping member comprised of a substantially soft flexible polyurethane having a Shore A hardness within the range of between about 75 and 90, and having a passageway extending therethrough from a first end of said gripping member to a second end thereof;

(j) the internal diameter of said gripping member passageway receiving in the first end thereof the said second end of said tubing, and forming a second joint for said assembly;

(k) a pair of substantially soft flexible polyurethane wings having a Shore A hardness within the range of between about 75 and 90 and positioned on said gripping member, and movable from a first position transverse to the axis of said passageway through said gripping member to a second position with said wings in facing relation to each other;

(l) a substantially rigid polyurethane catheter having a Shore D hardness within the range of between about 55 and 70 with a first end and a second end, and having the second end tapered for insertion into a vein;

(m) the first end of said catheter being inserted into the said second end of said passageway of said gripping member to form a third joint for said assembly;

(n) the internal diameter of said gripping member passageway being large enough to receive in the second end thereof the said first end of said catheter for said third joint;

(o) the mating surfaces of said first, second and third joints being joined together by dielectric welding for comingling the components of said mating surfaces; and

(p) the internal diameters of said first, second and third joints being of sufficient diameter for receiving a dielectric electrode for said dielectric welding.

4,710,176

NEEDLE DEVICE FOR USE WITH SUBCUTANEOUS CATHETER ASSEMBLIES

Richard L. Quick, Trabuco Canyon, Calif., assignor to Gish Biomedical, Inc., Santa Ana, Calif.

Continuation of Ser. No. 776,379, Sep. 16, 1985, abandoned. This application Nov. 3, 1986, Ser. No. 926,506

Int. Cl.[4] A61M *5/00*

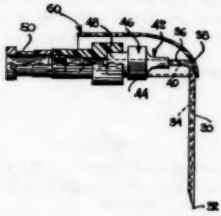
U.S. Cl. 604—177 **22 Claims**

1. A needle device adapted for use with a subcutaneous implanted assembly having a fluid reservoir, said device comprising:

(a) a tubular needle shank of the type used with a subcutaneous implanted fluid reservoir and having a tip portion adapted to extend through the skin and into the fluid reservoir, said shank having a bore through which fluid may enter or be withdrawn from said reservoir;

(b) a tubular arm angularly located with respect to said shank and being integrally connected to said shank, said arm having a bore in fluid communication with the bore of said shank,

(c) a mounting jacket extending partially around a portion of said arm and being secured to said arm, said jacket extending outwardly transversely from said arm and which is capable of being flatwise disposed on the surface of the skin adjacent to the region where the shank penetrates the



skin so that tape may be adhesively secured to the jacket and to the skin to retentively hold the needle device in a fixed position onto the user without the necessity of independently tapeing the arm to the user's skin, and

(d) an upstanding section on said jacket and being substantially rigid so that it can be grasped by an attendant with one hand and positioned with respect to a user and properly maneuvered to insert the tip portion through the user's skin and into the fluid reservoir.

4,710,177

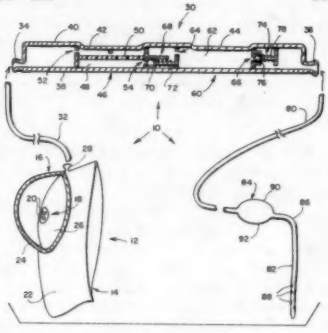
SUBCUTANEOUS VENTRICULAR INJECTION APPARATUS AND METHOD

Robert R. Smith, 2574 Lake Cir., Jackson, Miss. 39211, and Thomas B. Briggs, 238 E. Lorenz Bldg., Jackson, Miss. 39216

Filed May 15, 1986, Ser. No. 863,419

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—185 **14 Claims**



1. An injection system for delivering a fluid to a subcutaneous body site comprising:

a reservoir containing a plurality of doses of the fluid, said reservoir adapted to be subcutaneously located;

a subcutaneous catheter means for connecting said reservoir and the body site, siad catheter means including an end located at the body site;

a subcutaneous pump means located adjacent the body site and fluidly disposed between the end of said catheter means and said reservoir for pumping measured amounts of the fluid from said reservoir to the end of said catheter means, said pump means including a first depressible member which is manually depressed to pump the fluid; and

a subcutaneous valve means located adjacent said pump means and fluidly disposed between the end of said catheter means and said reservoir for blocking the flow of fluid through said catheter means even when said first depressible member of said pump means is depressed, said valve means including a resilient biasing means for resiliently biasing said valve means to the closed position and a second depressible member physically separated from said first depressible member which is manually depressed to overcome said resilient biasing means and open said valve means such that the flow of fluid through said catheter means is only accomplished when said first depressible member and said second depressible member are depressed simultaneously.

4,710,178

PRECISION INJECTION SYSTEM AND METHOD FOR INTRALIGMENTAL ANESTHESIA

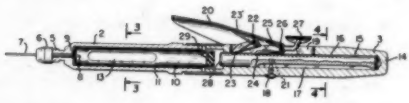
Henri Leonard, Besancon and Michel Seigneurin, St. Cergues-Douvaine, both of France, assignors to Micro-Mega S.A., Besancon, France

Continuation of Ser. No. 793,676, Oct. 31, 1985, which is a continuation-in-part of Ser. No. 547,768, Nov. 1, 1983, abandoned. This application Sep. 11, 1986, Ser. No. 906,641

Claims priority, application France, Nov. 3, 1982, 82 18546; Aug. 3, 1983, 83 12932; Nov. 9, 1984, 84 17226

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—209 **32 Claims**



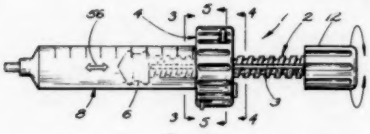
1. A precision injection system for intraligmental anesthesia, filling of tooth cavities by injection, and the like comprising, an intraligmental syringe having a tubular handle portion and exchangeable tubular headpieces mountable on and dismountable from the handle portion for exchange thereof with other individual headpieces, means for removably and releasably mounting the headpieces individually coaxially with the tubular handle portion extending longitudinally therefrom for jointly defining therewith a tubular syringe, each headpiece having in use at an end thereof a nozzle, each headpiece defining a chamber for carpule control and dimensioned for receiving therein and containing a carpule cartridge with either liquid or compositions of a semi-solid mass contents therein to be injected, a dosing plunger housed in the handle portion in a retracted starting position, a servo-dosing lever mounted externally on the tubular handle portion for activating the dosing plunger for incremental gradual advancing movement axially out of said handle portion from the starting position into said chamber of the headpiece to effect delivery of metered quantities of contents of the carpule cartridge for flow through said nozzle in dependence upon the incremental axial advancing movement of the dosing plunger, activating means on the tubular handle portion coactive with the servo-dosing lever and dosing plunger for activating the dosing plunger incrementally each time the servo-dosing lever is depressed, and means comprising a resetting key on the handle portion actuatable manually for enabling semiautomatic retraction of the dosing plunger to the retracted starting position.

4,710,179

SNAP-ON VERNIER SYRINGE

Terry M. Haber, Lake Forest; Clark B. Foster, El Toro, and John A. Lewis, Jr., Costa Mesa, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.

Filed Oct. 27, 1986, Ser. No. 923,572
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—211 **14 Claims**



1. A syringe assembly comprising:

a cylinder from which a volume of material can be dispensed;

piston means to be inserted in and moveable through said cylinder for expulsing material therefrom; and

collar means having a hole for receiving said piston means therethrough, said collar means being removably connected to said cylinder to support and align said piston means for movement through said cylinder, said collar means also including:

at least one exterior face;

an interior core spaced from said face;

an access opening formed in said face through which an end of said cylinder may be inserted, said collar means being removably connected to said cylinder when said cylinder is inserted through said access opening and rotated through the space between said exterior face and said interior core;

a catch member;

a seat formed in said interior core into which said catch member may be moved; and

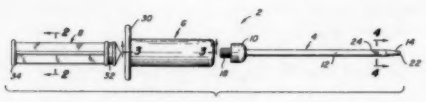
position control means communicating with said catch member and extending through said collar means to a manually accessible position thereof at which to control the movement of said catch member relative to said seat, said position control means being operable to move said catch member either into said seat in said core to permit the rotation of said cylinder end and the connection or disconnection of said collar means to or from said cylinder or out of said seat and into the space between said exterior face said interior core to block the rotation of said cylinder end and prevent the disconnection of said collar means from said cylinder.

4,710,180

LIPOJECT NEEDLE

Gerald W. Johnson, 2010 Castlerock, Houston, Tex. 77090

Filed Oct. 6, 1986, Ser. No. 915,550
Int. Cl.[4] A61M *5/325*
U.S. Cl. 604—239 **8 Claims**



1. Apparatus for the atraumatic injection of particles of fat into the body of a patient, comprising

an elongated needle having a successive proximal, intermediate, and distal portions and containing a through-bore extending continuously between said proximal and distal portions;

said needle intermediate portion having a generally tubular configuration;

said needle distal portion having a generally conical configuration, the remote end thereof having a blunt smooth surface;

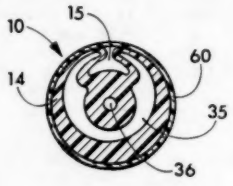
said needle intermediate portion containing a plurality of radial ports equally spaced about the circumference thereof adjacent said distal portion, the cross-sectional area of each of said ports corresponding with the cross-sectional area of said through-bore, whereby when said needle distal and intermediate portion are inserted into a given location in the body of a patient and when particles of fat are supplied to the proximal end of said needle through-bore, the particles are injected into the body via said ports.

4,710,181

VARIABLE DIAMETER CATHETER

Clark R. Fuqua, Salem, Va., assignor to Genus Catheter Technologies, Inc., Roanoke, Va.

Continuation-in-part of Ser. No. 743,705, Jun. 11, 1985, Pat. No. 4,601,713. This application Jun. 10, 1986, Ser. No. 872,601
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—280 **13 Claims**



1. A variable diameter catheter adapted to be folded in a longitudinal manner, comprising a resiliently flexible tube of generally uniform diameter along the length of said tube, said tube in cross-section having a single, external wall of varying thickness, such that the portion of said wall which is adapted to fold is thinner than the rest of said wall; said catheter comprising a means for retaining said fold in said tube, said fold retaining means surrounding said tube.

4,710,182

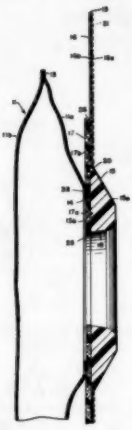
OSTOMY APPLIANCE AND METHOD OF MAKING

Robert M. Bryson, Arlington Heights, Ill., assignor to Hollister Incorporated, Libertyville, Ill.

Filed Dec. 4, 1986, Ser. No. 937,824
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—339 **18 Claims**

1. An ostomy appliance comprising an ostomy pouch equipped with a faceplate for adhesive attachment to a patient; said pouch being formed of thermoplastic film and having one wall provided with a stoma opening therein; said faceplate comprising a skin barrier ring, a microporous patch, and a connecting ring joining together said skin barrier ring, microporous patch, and pouch; said skin barrier ring being formed of a soft, pliable, water-absorbing composition having both dry tack and wet tack characteristics; said skin barrier ring also having a proximal face for sealingly engaging the peristomal skin surfaces of a patient and a generally planar distal face; said microporous patch being formed of thin, microporous sheet material having gas and water vapor transmissibility and having planar proximal and distal surfaces; said proximal surface being coated with a pressure-sensitive adhesive and said distal surface being generally coplanar with said distal face of said skin barrier ring; said microporous patch having an opening receiving said skin barrier ring; said connecting ring being formed of soft, flexible, liquid and gas impermeable, closed-cell

thermoplastic foam and having an outside diameter substantially greater than said opening of said microporous patch; said connecting ring covering, and being adhesively secured to, the distal face of said skin barrier ring and a concentric portion of



the distal surface of said microporous patch about said skin barrier ring; said connecting ring having a distal surface heat sealed to said wall of said pouch in an annular zone about said stoma opening.

4,710,183

OSTOMY APPLIANCE

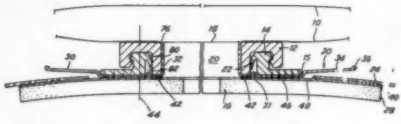
Peter L. Steer, Surrey, England, assignor to Craig Medical Products Ltd., Sussex, England

Continuation of Ser. No. 664,726, Oct. 25, 1984, abandoned. This application May 2, 1986, Ser. No. 860,695

Claims priority, application United Kingdom, Nov. 1, 1983, 8329121

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—344 **12 Claims**



1. A body side coupling for an ostomy appliance which includes a pad of medical grade adhesive, a coupling ring, and a flexible ring located between the pad and the coupling ring, the flexible ring extending outwardly radially of the coupling beyond the coupling ring and having a chute portion located to prevent discharged material from lodging in crevices formed when said body side coupling ring is assembled together with a mating coupling ring attached to an ostomy bag portion of said ostomy appliance and between said flexible ring and said body side coupling ring, said flexible ring secured to the adhesive pad adjacent said chute portion at a first annular region which is radially inwardly of the coupling ring with respect to the coupling axis of the mating coupling rings and secured to the coupling ring at a second annular region which is spaced apart and radially outwardly of the first annular region.

4,710,184

ABSORBING MATERIAL CONTAINING AN ISOTHIAZOLINE-ONE-3 DERIVATIVE, APPLICATION TO PERSONAL HYGIENE AND PROCESS FOR MANUFACTURING THIS MATERIAL

Philippe Ehret, Colmar, France, assignor to Beghin-Say S.A., Thumeries, France

PCT No. PCT/FR84/00074, § 371 Date Nov. 23, 1984, § 102(e) Date Nov. 23, 1984, PCT Pub. No. WO84/03631, PCT Pub. Date Sep. 27, 1984

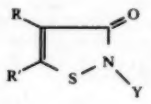
PCT Filed Mar. 20, 1984, Ser. No. 689,043

Claims priority, application France, Mar. 23, 1983, 83 04785

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—368 **12 Claims**

1. An absorbent article comprising a continuous material and a second material incorporated in said continuous material, said second material including a water-insoluble, hydrocolloidal polyelectrolyte capable of absorbing an aqueous liquid several times its own weight, said polyelectrolyte having an isothiazoline-one-3 derivative of the general formula:



wherein

Y is a hydrogen atom, a C_1 to C_8 linear or branched alkyl group, or a C_3 to C_6 cycloalkyl group,

R is a hydrogen atom, a C_1 to C_4 alkyl group or a halogen, and

R′ is a hydrogen atom, a C_1 to C_4 alkyl group or a halogen, in contact therewith, said absorbent article being constructed and arranged for application to a human's anatomy for purposes of personal hygiene.

4,710,185

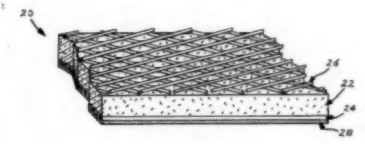
FORAMINOUS NET COVER FOR ABSORBENT ARTICLES

James C. Sneyd, Jr.; Robert D. Harris, both of Cobb County, and Margaret G. Latimer, Fulton County, all of Ga., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 775,480, Sep. 12, 1985, abandoned. This application Nov. 20, 1986, Ser. No. 931,952

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—372 **41 Claims**



1. An absorbent article for proximate contact with a mammalian body adapted to receive a fluid containing discharge therefrom, including an abosrbent member bearing a clean, dry body-side cover as an interfacial fluid transfer and stain masking member, said cover comprising a foraminous net having a generally recticular network of first and second arrays of continuous polymeric monofilaments disposed generally parallel one to another within each of said arrays and at a displacement angle between respective arrays.

4,710,186

CLEAN AND DRY APPEARANCE FACING

Edmund Z. DeRossett, Mercerville, and Thomas J. Luceri, Little Ferry, both of N.J., assignors to Personal Products Company, Milltown, N.J.

Filed Jul. 20, 1984, Ser. No. 632,753
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—383 **7 Claims**

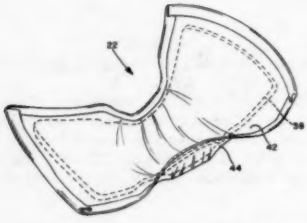
1. In a product to be worn for absorbing body fluids and comprising an absorbent core having a body facing side and a garment facing side, the improvement wherein said body facing side has an overlying facing layer comprising a continuous sheet comprising a polyolefin selected from the group consisting of polyethylene, polypropylene or copolymers thereof; said sheet having apertures therethrough for allowing for the passage of body fluids; said sheet comprising from about 5 to about 12% by weight of a opacifying agent; said apertures comprising at least about 15% open area but an amount of open area insufficient to reduce the brightness of the film to less than 45.

4,710,187

FORM-FITTING SELF-ADJUSTING DISPOSABLE GARMENT WITH A STRETCHABLE BODYSIDE LINER

Leona G. Boland, Neenah; Robert A. Stevens, Appleton; John C. Wilson, Neenah, and Georgia L. Zehner, Larsen, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Sep. 6, 1985, Ser. No. 773,743
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 A **36 Claims**



1. An anatomically form-fitting, generally self-adjusting disposable absorbent garment comprising:

a breathable elastomeric nonwoven outer cover comprising a nonwoven elastic web joined to one or more gatherable nonwoven webs, including a waist opening, a pair of leg openings, a central crotch section between said leg openings and front and rear panels separated by said crotch section;

an absorbent insert structure, substantially superposable on said front and rear panels and said crotch section having longitudinally opposed ends and including a liquid permeable bodyside liner resiliently stretchable or expansible in at least one direction and a liquid impermeable barrier with an absorbent core disposed therebetween; and

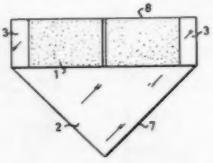
attachment means for attaching and integrating said insert to said outer cover while allowing substantially unrestricted functional stretchability thereof.

4,710,188

INCONTINENCE PROTECTOR AND A METHOD FOR ITS MANUFACTURE

Bo Runeman, Göteborg, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden

Filed Feb. 4, 1986, Ser. No. 825,913
Claims priority, application Sweden, Feb. 4, 1985, 8500492
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—385 R **2 Claims**



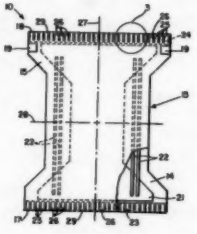
1. A method of manufacturing an incontinence protector for men, comprising securing together a rectangular absorbent layer and a rectangular liquid impermeable layer with an edge of the impermeable layer extending beyond the adjacent edge of the absorbent layer, folding the secured together layers double with the impermeable layer on the outside about a fold line perpendicular to said edge of the impermeable layer, thereby to bring two lengths of said edge of the impermeable layer into parallel jaxtaposed position, and securing together only said juxtaposed lengths of said edge of the impermeable layer along a line of securement that is perpendicular to said fold line and that meets said fold line at one end of said fold line.

4,710,189

SHAPED DISPOSABLE DIAPERS WITH SHAPED ELASTICALLY CONTRACTIBLE WAISTBANDS

Glen R. Lash, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 756,416, Jul. 18, 1985, abandoned, which is a continuation of Ser. No. 476,734, Mar. 18, 1983, abandoned. This application Mar. 3, 1987, Ser. No. 21,074
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 A **5 Claims**



1. A disposable diaper comprising:

a liquid permeable topsheet;

a liquid impermeable backsheet, said backsheet being affixed to said topsheet;

an absorbent element, said absorbent element being interposed between said backsheet and said topsheet;

a waistband extending from the laterally extending margin of the diaper to about the laterally extending margin of said absorbent element;

fold regions at which said topsheet and said backsheet are folded; and

an elastomeric element, said elastomeric element being af-

fixed to said waistband, said elastomeric element having a middle portion of relatively less contraction and a pair of additional portions of relatively more contraction compared to said middle portion, said additional portions being separated by said middle portion.

4,710,190

DIAPER HAVING IMPROVED REINFORCED AREA FOR RECEIVING ADHESIVE FASTENING TAPE

Leigh E. Wood, Woodbury; John A. Miller, and Alan J. Sipinen, both of Maplewood, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 4, 1986, Ser. No. 903,680
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—389 **19 Claims**

1. Disposable diaper which includes an outer liquid-impermeable film and a bilayer film bonded to the liquid-impermeable film as a peel-resistant reinforced fastening area to which pressure-sensitive adhesive fastening tapes attached at another part of the diaper may be adhaered to hold the diaper in a closed position, the bilayer film

comprising a reinforcing layer and a room-temperature-non-tacky bonding layer, and

being bonded to the liquid-impermeable film under heat and pressure that leaves the liquid-impermeable film substantially undeformed,

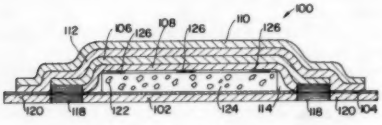
the bonding layer holding the reinforcing layer to the liquid-impermeable film with greater force than that which the fastening tape applies when adhered to the top of the bilayer film, whereby the fastending tapes may be reliably and lastingly adhered to the reinforced area of the diaper by hand pressure, and may be removed and reapplied, all without distortion or tearing of the liquid-impermeable film.

4,710,191

THERAPEUTIC DEVICE FOR THE ADMINISTRATION OF MEDICAMENTS

Alfred Kwiatek, New York, N.Y., and Jack W. Schwartz, Burlington, Vt., assignors to Jonergin, Inc., Swanton, Vt.

Filed Dec. 16, 1985, Ser. No. 809,483
Int. Cl.[4] A61K *9/00*
U.S. Cl. 604—897 **16 Claims**



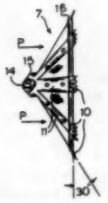
1. A device for the administration of an active agent to the skin or mucosa of a host comprising a reservoir containing said active agent, said reservoir including an inner surface and an outer surface, a release layer formed on said inner surface of said reservoir, and active agent impermeable backing layer formed on said outer surface of said reservoir, said backing layer overlying said release layer and sealed thereto about a circumferential sealed area so as to enclose said reservoir, said backing layer and said release layer extending peripherally beyond said selaed area about the entire periphery thereof so as to create an extended peripheral area, adhesive means disposed between said backing layer and said release layer in said extended peripheral area and thereby separated from said reservoir by said sealed area, said adhesive means addapted to adhere said device to the skin or mucosa of said host upon removal of said release layer, whereby said active agent is released from said reservoir to provide a dose of said active agent.

4,710,192

DIAPHRAGM AND METHOD FOR OCCLUSION OF THE DESCENDING THORACIC AORTA

Domingo S. Liotta, and Holga E. Troncoso De Liotta, both of 3 De Febrero 2025, Buenos Aires, Argentina (1428)

Filed Oct. 17, 1986, Ser. No. 919,984
Claims priority, application Argentina, Dec. 30, 1985, 302764
Int. Cl.[4] A61F *2/06*; A61B *17/00, 17/12*
U.S. Cl. 623—1 **9 Claims**



1. A diaphragm for providing occlusion in a descending thoracic aorta, of the type capable of isolating a portion of the aorta affected by an aneurysm, and installed via a surgical treatment in which a permanent arterial by-pass of medically compatible material extending from the ascending aorta to the abdominal aorta is provided, said diaphragm comprising:

a flexible and substantially circular element, said circular element including a cushion rim around the outer periphery thereof, said cushion rim having a thickness substantially greater than said circular element; and

a plurality of resilient ribs having inner and outer ends supporting said circular element, said inner ends of said ribs joined together at a hub with said ribs extending radially outwardly therefrom, said ribs generally positioned on and attached to said circular element with said outer ends of said ribs having protrusions projecting radially beyond said cushion of said circular element, said ribs having a resilient expansion tendency, such that said diaphragm may be held in a biased collapsed position during installation, and sprung open into a normally vaulted shaped upon installation in the aorta, whereby said protrusions are urged radially outwardly by the resilient expansion tendency of said ribs to engage the aorta and hold said diaphragm in position.

7. A surgical procedure for treating an aneurysm in a patient's descending thoracic aorta, comprising the steps of:

installing an artificial aorta by-pass connecting the patient's ascending natural aorta with the patient's abdominal aorta end;

installing a temporary graft onto said by-pass; and

advancing a catheter having a capsule end holding a retracted diaphragm through said graft;

positioning said diaphragm into a selected site in said aorta; and

releasing the diaphragm by ejecting it from the capsule thereby allowing said diaphragm to spring open into a vaulted shape and engage the inner walls of aorta all around; and

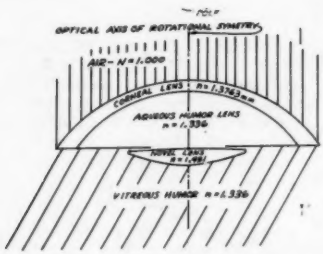
withdrawing the catheter with the diaphragm remaining within the aorta to provide an occlusion therein.

4,710,193

ACCOMMODATING INTRAOCULAR LENS AND LENS SERIES AND METHOD OF LENS SELECTION

David Volk, 3336 Kersdale Rd., Pepper Pike, Ohio 44124

Filed Aug. 18, 1986, Ser. No. 897,656
Int. Cl.[4] A61F 2/16
U.S. Cl. 623—6 **15 Claims**


OPTICAL AXIS OF ROTATIONAL SYMMETRY
AIR - N = 1.000
CORNEAL LENS - N = 1.3763 ± .0
AQUEOUS HUMOR LENS
n = 1.336
NOVEL LENS
n = 1.491
VITREOUS HUMOR n = 1.336

1. An intraocular lens for the correction of the axial refractive error and the accommodative insufficiency of the post-surgical aphakic eye, made of homogeneous transparent optical material, for placement in the posterior chamber of the human aphakic eye, of continuously and regularly increasing refractive power peripheralward, of a diameter between 4.5 mm and 7 mm and of thickness between 0.65 mm and 1 mm, with at least one surface of said intraocular lens a positive aspheric surface of revolution having an apical umbilical point at which the derivative of curvature vanishes, said surface increasing continuously and regularly in curvature and refractive power from said apical umbilical point to its periphery and where the magnitude and shape of said surface is defined mathematically by means of the following expression:

$$y=(Ax+Bx^2)^{\frac{1}{2}}+Cx^{(p)}+Dx^{(q)}+Ex^{(z)},$$

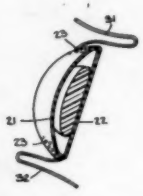
where $A=2r_{apex}$, $B=(e^2-1)$, e being the eccentricity at the apex of said surface, where C, D, and E are integral or non-integral coefficients of $x^{(p)}$, $x^{(q)}$, and $x^{(z)}$ respectively, and where p, q, and z can be integral or non-integral exponents of x, and where r ranges from 5 mm to 150 mm, where e ranges from 0.0 to 4.0, where at least one of the values of C, D, and E is other than zero, values of C, D, and E ranging from 0.0 to ±9, the values of p, q, and z range from a value of 0.5 to 6.0.

4,710,194

INTRAOCULAR LENS WITH OPTIC OF EXPANDABLE HYDROPHILIC MATERIAL

Charles D. Kelman, 269 Grand Central Pkwy., Floral Park, N.Y. 11005

Filed Oct. 20, 1986, Ser. No. 921,227
Int. Cl.[4] A61F 2/16
U.S. Cl. 623—6 **18 Claims**



18. An intraocular lens for implantation in a human eye, comprising:

optic means of hydrophilic material adapted to be in contracted condition when dry and to expand to an expanded condition in response to uptake of liquid from the environment, said hydrophilic optic means being formed to such a size and shape, in dry contracted condition thereof, that it will have the desired optical characteristics when in final expanded condition thereof;

position-fixation means for seating the lens in the eye, said position-fixation means being constructed of substantially non-hydrophilic material so as to retain their shape and resiliency characteristics substantially independently of the liquid environment within the eye; and

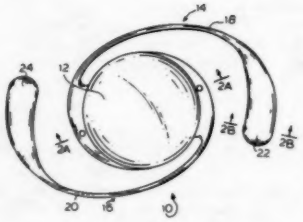
connecting means for securing said hydrophilic optic means to said position-fixation means, said connecting means being constructed to permit expansion of said optic means from contracted to expanded condition thereof without resulting in any substantial movement being imparted to said position-fixation means, said connecting means being adapted to position said hydrophilic optic means generally centrally with respect to the optical axis of the eye, when said hydrophilic optic means is in said expanded condition thereof, and to permit seating of said position-fixation means within the eye irrespective of the size of said hydrophilic optic means between said contracted and expanded conditions thereof.

4,710,195

POSTERIOR CHAMBER INTRAOCULAR LENS

Vincent J. Giovinazzo, 299 Lighthouse Ave., Staten Island, N.Y. 10306

Filed Apr. 18, 1986, Ser. No. 853,551
Int. Cl.[4] A61F 2/16
U.S. Cl. 623—6 **5 Claims**



1. A posterior chamber intraocular lens usable as an implant in cataract patients, the lens comprising:

an optic capable of performing the focusing function of a human lens;

a first haptic having a substantially continuous surface and being connected to said optic;

a second haptic having a substantially continuous surface and being connected to said optic; and

a first blockiing segment connected to said first haptic, said first blocking segment having a chord length of at least 1.5 mm and having a width of at least 1.5 mm and defining a substantially circumferentially linear segment for contacting eye tissue over substantially its entire length, said first blocking segment being curved and when, in an eye, positioned such that it is posteriorly convex;

said first blocking segment being sufficiently rigid to retain its shape;

said first and second haptics being sufficiently flexible to permit insertion of the lens behind a pupil while being sufficiently rigid to avoid bending or pulling in response to a negative pressure;

said first and second haptics both being vaulted in an anterior direction away from said optic.

4,710,196

INTRAOCULAR CRYSTALLINE LENS

Nikola G. Dyakov; Pravoslava T. Guguchkova-Yanchuleva, and Dimiter V. Benchev, all of Sofia, Bulgaria, assignors to V T P "Maimex", Sofia, Bulgaria

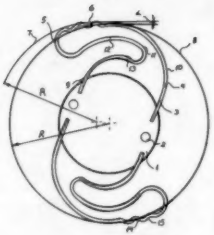
PCT No. PCT/BG85/00001, § 371 Date Sep. 5, 1985, § 102(e) Date Sep. 5, 1985, PCT Pub. No. WO85/02995, PCT Pub. Date Jul. 18, 1985

PCT Filed Jan. 4, 1985, Ser. No. 776,787

Claims priority, application Bulgaria, Jan. 5, 1984, 63804

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **2 Claims**



1. An implantable intraocular lens assembly comprising:

a circular crystalline lenticular body formed with a pair of mutually parallel frontal apertures traversing opposite lens surfaces, and two pairs of mutually parallel lateral apertures opening along the circumference of said lenticular body; and

two asymmetric elastic loops disposed symmetrically with respect to a center of said body for affixing the lens assembly to and eye surface surrounding said assembly, each of said loops:

having respective mutually parallel straight portions received in the lateral apertures of a respective one of said pairs,

being continuously curved between said straight portions,

having outwardly convexly curved inner and outer portions diverging toward a bight in the form of a circular arc segment with a radius of 0.3 to 0.8 mm with said outer portion being progressively of increasing spacing from said circumference away from a respective straight portion and constituting a supporting sector engageable with said eye surface,

being so formed with said supporting sector that said supporting sector has an enveloping circumference with a radius of curvature R equal to that of said eye surface and intersected by a circle concentric with said body such that tangents to said circle and enveloping circumference at a point of intersection include an angle of 1.5° to 7.5°,

being constructed so that said supporting sector and said bight are connected respectively by connecting sectors to said straight portions, said connecting sectors having the same elasticity, and

said supporting sector has a wavy configuration with at least two outwardly convex parts alternating with at least two outwardly concave parts.

4,710,197

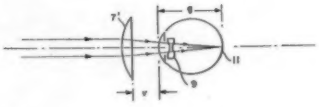
INTRAOCULAR-EXTERNAL LENS COMBINATION SYSTEM AND METHOD OF USING SAME

Anthony Donn, 635 W. 165th St., New York, N.Y. 10032, and Charles J. Koester, 60 Kent Rd., Glen Rock, N.J. 07452

Filed Oct. 30, 1981, Ser. No. 316,920

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **34 Claims**



28. A negative-powered intraocular lens sized and shaped for implantation in the eye, said lens providing greater than a 2X magnification power of the retinal image when used in combination with an external positive lens and a field of view of at least 27°.

4,710,198

1:2 CHROMIUM OR COBALT METAL COMPLEX DYES AND USE THEREOF FOR DYEING LEATHER

Fabio Beffa, Riehen, and Hans U. Schütz, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

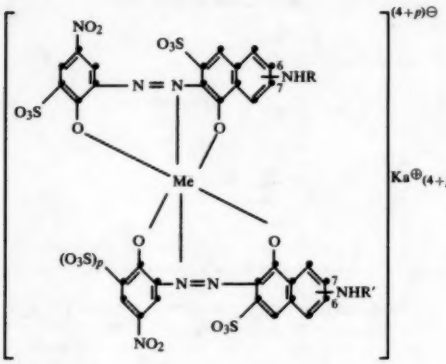
Filed Dec. 9, 1985, Ser. No. 806,871

Claims priority, application Switzerland, Dec. 17, 1984, 5995/84

Int. Cl.[4] C09B *29/30, 45/14;* D06P *1/10, 3/24*

U.S. Cl. 8—437 9 Claims

1. A process of dyeing leather which comprises contacting said material with a dye of the formula



wherein

Me is cobalt or chromium,

$Ka^{\oplus}$ is a cation,

p is 0 or 1,

R and R′ are each independently of the other hydrogen or a group of the formula —CO—$(O)_n$—Y, where

n is 0 or 1, and

Y is C_1–C_5alkyl, or phenyl which may be substituted by nitro, halogen, C_1–C_5alkyl or C_1–C_5alkoxy,

with the proviso that R and R′ may not both be hydrogen, $—COCH_3$ or $—COC_2H_5$ if p is 1.

4,710,199

METHOD OF DYEING AN OPTICAL ARTICLE

Hans R. Suter, Wangen, Switzerland, assignor to Roag (AG), Illnau, Switzerland

Continuation-in-part of Ser. No. 740,851, Jun. 3, 1985, abandoned. This application May 19, 1986, Ser. No. 864,716

Int. Cl.[4] D06P *5/00*

U.S. Cl. 8—507 4 Claims

1. A method of dyeing an optical article of plastic, comprising the steps of immersing said article in a dyeing solution in a tank, subjecting said dyeing solution to heating energy exclusively via a side wall of said tank, and to ultrasonic energy via the bottom wall of said tank, said ultrasonic energy having a frequency range of 25,000 to 60,000 hertz to excite the particles of dye continuously within the dyeing solution and to constantly and consistantly agitate said solution, maintaining said article in said solution until the desired tint is obtained, removing the article from the solution and then rinsing and drying the article.

4,710,200

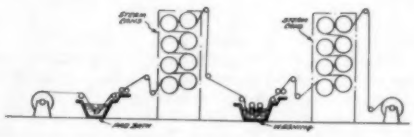
PROCESS FOR THE CONTINUOUS DYEING OF POLY(M-PHENYLENE-ISOPHTHALAMIDE) FIBERS

Barbara J. Cates, and Tanya E. FitzGerald, both of Greensboro, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed May 14, 1986, Ser. No. 863,038

Int. Cl.[4] C09B *67/00*

U.S. Cl. 8—574 24 Claims



1. A process for continuously dyeing a poly(m-phenyleneisophthalamide) fiber, comprising the steps of:

(1) contacting a dyeable poly(m-phenyleneisophthalamide) fiber with a solution of a dye dissolved in an organic swelling agent adapted to swell said fiber and selected from the group consisting of N-methylpyrrolidone, dimethylsulfoxide, and dimethylacetamide, and a diluent, selected from the group consisting of water, xylene, ethylene glycol, lower alcohols and 4-butyrolactone in which the weight ratio of swelling agent to diluent is from about 70:30 to 90:10, the solution maintained at a temperature in the range of about 65° F. to about 200° F.;

(2) heating the poly(m-phenyleneisophthalamide) fiber treated in step (1) to fix said dye to said fiber;

(3) washing the fiber to remove any residual dye and organic swelling agent; and

(4) drying the fiber.

4,710,201

MODIFIED SUCCINIMIDES (IX)

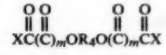
Thomas F. Buckley, Hercules, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 904,086, Sep. 4, 1986, which is a continuation-in-part of Ser. No. 820,457, Jan. 17, 1986, abandoned. This application Mar. 20, 1987, Ser. No. 28,351

Int. Cl.[4] C10L *1/18, 1/22*

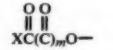
U.S. Cl. 44—63 39 Claims

1. A fuel composition comprising a hydrocarbon boiling in the gasoline or diesel range and from about 10 to 10,000 parts per million of a product produced by the process which comprises contacting at a temperature sufficient to cause reaction a polyamino alkenyl or alkyl succinimide having at least one primary or secondary amino group with a compound of the Formula V:

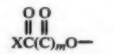


V

wherein R_4 is selected from the group consisting of a divalent hydrocarbyl of from 2 to 30 carbon atoms with the proviso that the hydrocarbyl carbon atom bound to one



group is not also bound to the other



group and $—R_5—OR_5—_p$ wherein R_5 is alkylene of from 2 to

5 carbon atoms and p is an integer of from 1 to 100; X is selected from the group consisting of bromo, chloro and —OR_6 wherein R_6 is selected from the group consisting of alkyl of from 1 to 6 carbon atoms, phenyl and phenyl substituted with 1 to 2 substituents selected from the group consisting of chloro, bromo, nitro, alkyl of from 1 to 6 carbon atoms and trifluoromethyl; and m is independently an integer of from 0 to 1 and wherein the molar charge of the compound of Formula V to the basic nitrogen of the polyamino alkenyl or alkyl succinimide is from about 0.1:1 to about 0.5:1.

4,710,202

APPARATUS FOR GASIFYING PULVERIZED COAL

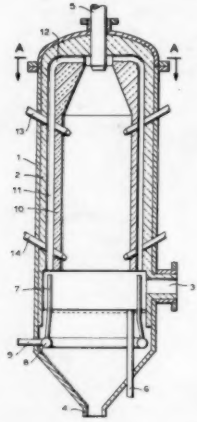
Peter Göhler; Rolf Mangler; Manfred Schingnitz, all of Freiberg; Wolfgang Seidel, Oberbobritzsch; Friedrich Berger, Brand-Erbisdorf, all of German Democratic Rep.; Ernest Gudymov, Moscow, U.S.S.R.; Vladimir Semenov, Moscow, U.S.S.R.; Vasilij Fedotov, Moscow, U.S.S.R., and David Gamburg, Moscow, U.S.S.R., assignors to Brennstoffinstitut Freiberg, Freiberg, German Democratic Rep.

Filed Nov. 7, 1986, Ser. No. 928,750

Claims priority, application German Democratic Rep., Nov. 12, 1985, 2827492

Int. Cl.[4] C10J *3/48*

U.S. Cl. 48—73 **13 Claims**



1. An apparatus for gasifying pulverized coal, the apparatus comprising:

a housing having a top, a lower part with a bottom, a granulated slag discharge opening in said bottom, and a producer gas outlet opening in said lower part;

a layer of thermal insulation lining said housing;

a pulverized coal burner extending axially through said top and being formed to produce a flame for gasifying coal to provide a producer gas;

a layer of heat-resistant lining located above said producer gas outlet opening and defining a discharge area, said pulverized coal burner having an extended portion extending axially into said discharge area so as to direct said flame axially downward further into said discharge area, said discharge area having an upper space radially surrounding said extended portion of said pulverized coal burner;

a plurality of ducts arranged between said heat-resistant lining and said thermal insulation and each having an outlet opening communicating with said upper space of said discharge area and having an inlet opening, each of said ducts extending horizontally from said outlet opening and then bending vertically downward to terminate at said inlet opening;

means for injecting steam into said inlet opening of each of said ducts; and

means for cooling the producer gas and including a plurality of cooling medium supply nozzles arranged in said housing and extending into said discharge area.

4,710,203

ELECTROSTATIC PRECIPITATOR ELECTRODE

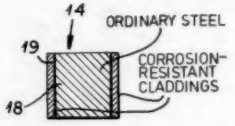
Willi Bätza, Offenbach, and Werner Rösch, Oberursel, both of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Jan. 10, 1986, Ser. No. 818,126

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1985, 3501155

Int. Cl.[4] B03C *3/04, 3/41, 3/47*

U.S. Cl. 55—2 **1 Claim**



1. A method of operating an electrostatic precipitator for the removal of pyrophoric dust from a gas, comprising the steps of:

(a) forming corona-discharge electrode assemblies by tensioning corona-discharge electrode strips each composed of a sheet steel core clad on opposite sides with a corrosion-resistant steel and cut from sheet metal having an overall thickness of 1.5 to 2 mm and a cladding thickness of 8 to 12% of the overall thickness, in a frame, said corrosion-resistant steel cladding being resistant to spalling induced by pyrophoric reaction of deposits on said electrodes and selected from the group which consists of:

(a_1) titanium or niobium stabilized steel with 10 to 18% by weight chromium, up to 0.1% by weight carbon, up to 1.0% by weight silicon, up to 1% by weight manganese, the balance being iron and unavoidable impurities which do not affect the properties of the composition,

(a_2) titanium or niobium stabilized steel with 16 to 20% by weight chromium, 7 to 12% by weight nickel, up to 0.1% by weight carbon, up to 1% by weight silicon, up to 2% by weight manganese, the balance being iron and unavoidable impurities, and

(a_3) a steel with 26 to 28% by weight chromium, 4 to 5% by weight nickel, 1.3 to 2% by weight molybdenum, up to 0.1% by weight carbon, up to 2% by weight manganese, the balance being iron and unavoidable impurities;

(b) juxtaposing said assemblies with collector electrodes; and

(c) electrostatically precipitating pyrophoric dust by electrostatically energizing said electrodes and passing said dust between said collector electrodes and said corona-discharge electrodes at a temperature of substantially 150° C. to 250° C.

4,710,204

POLYPHOSPHAZENE GAS SEPARATION MEMBRANES

Menahem A. Kraus, St. Louis, and Milton K. Murphy, St. Charles, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 28, 1983, Ser. No. 566,244

Int. Cl.[4] B01D *53/22*

U.S. Cl. 55—16 **2 Claims**

1. A process for separating acid gases from non-acid gases comprising:

contacting a gaseous feed mixture of acid gases and non-acid gases with a first surface of a separation membrane comprising polyphosphazenes having a preferential selectivity

and permeability for the acid gases and represented by the formula:

where n is between about 100 and about 70,000; where Y and Y′ are the same or different and are comprised of oxygen, sulfur or nitrogen; R and R′ are the same or different and are comprised of alkyl, aryl, substituted alkyl, or substituted aryl groups, each group having from 1 to about 25 carbon atoms;

maintaining a second surface of the polyphosphazene membrane at a lower chemical potential for the acid gases than the chemical potential at the first surface;

permeating the acid gases into and through the polyphosphazene membrane; and

removing from the vicinity of the second surface a permeated product having a greater concentration of acid gases relative to non-acid gases than contained in the gaseous feed mixture.

4,710,205

STABILIZED LIQUID FILMS

David W. Deetz, Apple Valley, and Maurice M. Kreevoy, Minneapolis, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 16, 1987, Ser. No. 25,920
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—158 **22 Claims**

1. A stabilized immobilized liquid membrane (ILM) for transporting at least one gaseous species of interest comprising:

a composite membrane structure further comprising an ultra-thin membrane skin having microscopic pores therein characterizing an anisotropic microporous film and a relatively thick macroporous support substrate carrying said utra-thin membrane skin; and

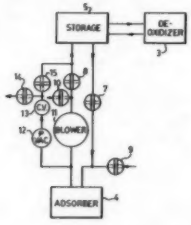
a quantity of liquid transport medium contained in the pores of said ultra-thin membrane skin.

4,710,206

ATMOSPHERE CONTROLLING PROCESS FOR FOOD STORAGE

Ronald C. Allen, 654 Geneva St., St. Catherines, Ontario, Canada L2N 2J8, and V. Sajur, 49 Arthur St., St. Catharines, Ontario, Canada L2M 1H1

Filed Jul. 7, 1986, Ser. No. 883,041
Int. Cl.[4] B01D *53/04*
U.S. Cl. 55—58 **5 Claims**



1. A process for removing undersiable gasses form mixed gasses in a storage chamber with minimal variation in pressure within the storage chamber comprising the following sequence of steps:

(a) circulating the mixed gasses through an adsorber chamber to remove the undesirable gasses for a first period of time;

(b) shutting off the adsorber chamber inlet from the storage chamber;

(c) reducing the pressure in the adsorber chamber by expelling a portion of the gas in the adsorber chamber into the storage chamber;

(d) shutting off the adsorber chamber outlet to the storage chamber;

(e) opening the adsorber chamber inlet and outlet to the ambient atmosphere and flushing the adsorber chamber with air from the ambient atmosphere;

(f) shutting off the adsorber chamber inlet from the ambient atmosphere and reducing the pressure in the adsorber chamber by expelling portion of the gas in the adsorber chamber to the ambient atmosphere;

(g) shutting off the adsorber chamber outlet to the ambient atmosphere;

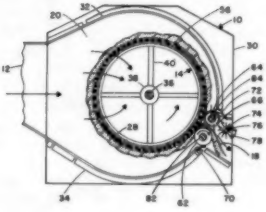
(h) opening the adsorber chamber inlet and outlet to the storage chamber and repeating the steps starting at step (a).

4,710,207

AIR FILTERING APPARATUS WITH ROLLER ASSEMBLY FOR CLEANING

Paul W. Bodovsky, Sherman, and Donald H. Rodgers, Dennison, both of Tex., assignors to Continental Conveyor & Equipment Co., Inc., Winfield, Ala.

Continuation of Ser. No. 415,867, Sep. 8, 1982, abandoned, which is a continuation of Ser. No. 248,148, Mar. 30, 1981, abandoned. This application Jan. 30, 1984, Ser. No. 575,132
Int. Cl.[4] B01D *46/04*
U.S. Cl. 55—290 **1 Claim**



1. Apparatus for filtering air including a chamber,

a drum mounted for rotation within said chamber,

filtering media secured to the cylindrical surface of said drum,

means to cause a flow of particle ladened air into said chamber and into contact with said filtering media and to cause a flow of clean air from within said drum to exterior of said drum and said chamber,

means to remove bat formed of filtered particles from the filtered media on the surface of said drum including a compression seal roller mounted for rotation out of contact with said drum but at a distance to contact and remove bat therefrom,

a doffing roller having flights made of flexible sheet material extending across the drum, each of said flights of said doffing roller having forwardly disposed faces, said doffing roller mounted for rotation to have said forwardly disposed faces of said flights contact said drum to assist in removing bat from said drum,

a wiper roller having rigid flights made of sheet material extending across the wiper roller and mounted for rotation in the same direction as the flights of said doffing roller whereby said rigid flights will contact said forwardly disposed faces of said doffing roller to direct bat away from said doffing roller and to preclude bat from

being rotatably transported back towards said filtering media on said drum surface by said doffing roller, and

means to rotate said drum, doffing roller and wiper roller in a first direction of rotation and to rotate said seal roller in a direction of rotation opposite from said first direction of rotation.

4,710,208

SUSPENDABLE MODULAR FRAME ARRANGEMENT FOR CLEAN ROOM CEILINGS HAVING A FLUID SEAL

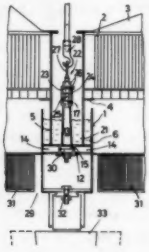
Wolf Ziemer, Berlin; Fritz Neubert, Kissing, and Wilhelm Hölle, Münzenberg, all of Fed. Rep. of Germany, assignors to Fläkt AB, Nacka, Sweden

Filed Dec. 27, 1985, Ser. No. 814,227

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447901

Int. Cl.[4] B01D *46/00*

U.S. Cl. 55—355 **17 Claims**



1. Modular frame arrangement for clean room ceilings suspendable from the ceiling of a room for receiving filters comprising: a sealing fluid; at least two structural rails intersecting at a given angle to each other and each having U-section channels facing up for receiving the fluid and provided with a lower web having at least one hollow chamber extending longitudinally of the rail and an upstanding central web; and an angular connection member for connecting the structural rails comprising a central part having a tube guide passing from the top to the bottom therethrough, and at least two arms integrally formed to project out laterally from said central part at said given angle to each other, each arm having an upwardly-facing channel for said sealing fluid, said channels of the arms being interconnected to interconnect said U-section channels of the intersecting rails, the lower surfaces of the arms being offset upwardly from the lower surface of said central part to form upright abutment surfaces, said arms being engaged in the U-section channels of said rails respectively so that the ends of said lower web hollow chambers confront said abutment surfaces.

4,710,209

MOISTURE TRAP FOR FLUID SUCTION EQUIPMENT, IN PARTICULAR AS EMPLOYED IN DENTISTRY

Augusto Cattani, Parma, Italy, assignor to Officine Agusto Cattani & C. S.p.A., Parma, Italy

Filed Jun. 19, 1986, Ser. No. 876,271

Claims priority, application Italy, Jul. 31, 1985, 40080 A/85

Int. Cl.[4] B01D *45/16, 45/08, 51/00*

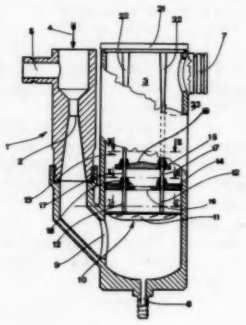
U.S. Cl. 55—418 **4 Claims**

1. A moisture trap for separating liquid and air from a fluid suspension of air and liquid, for use with fluid suction dental equipment, comprising:

a generally cylindrical, vertical separation chamber for separating liquid and air from a fluid suspension fo air and liquid, sealed by a concave interior bottom wall and a top wall including a removable flanged lid, said chamber having an inlet located at a lower portion of the cylindrical sidewall of said chamber, a liquid outlet located at the lowest level of said concave interior bottom wall, and an air outlet located at an upper portion of the cylindrical sidewall opposite said inlet;

an intake for a fluid suspension of air and liquid including a venturi duct, said intake in fluid communication with said inlet;

a circular separator baffle disk having opposite edges bent downward, said disk positioned within said separation chamber to substantially block said chamber above said inlet;



a circular peripheral baffle disk having a central opening, said peripheral baffle positioned above said separator baffle disk within said separation chamber;

a circular core baffle disk having an outside diameter smaller than said peripheral baffle disk, said core baffle disk positioned above said peripheral baffle disk within said separation chamber; and

mounting means for securing said baffle disks to each other at a fixed distance and relative orientation, said mounting means secured to said removable flanged lid to secure said disks at a fixed position within said separation chamber.

4,710,210

CRYOGENIC PROCESS FOR THE REMOVAL OF ACIDIC GASES FROM MIXTURES OF GASES BY USING SOLVENTS

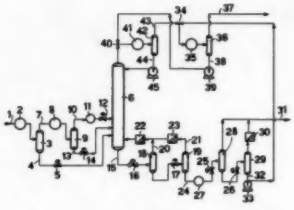
Luigi Gazzi, Milan, and Carlo Rescalli, San Donato Milanese, both of Italy, assignors to Snamprogetti, S.p.A., Milan, Italy

Filed May 16, 1986, Ser. No. 863,875

Claims priority, application Italy, May 24, 1985, 20890 A/85

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—17 **6 Claims**

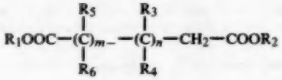


1. Cryogenic process for the removal of acidic gases from natural gases or from synthesis gases essentially comprising an absorption in one or more towers in order to reduce the content of acidic gases, a cooling carried out, in the case of one single absorber tower, upstream the same tower, or, in case of two absorber towers, between the same towers, a regeneration of the solvent or of the solvents used in the absorption, the

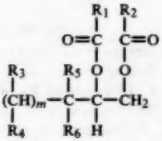
solvent or the solvents used being selected among low molecular weight esters, alcohols and ethers, belonging to the following classes:

esters of alcohols of general formula R_1COOR_2, wherein R_1 and R_2 are alkyl groups of from 1 to 4 carbon atoms, equal to or different from each other, wherein one or more hydrogen atoms can be substituted by alcoholic groups;

esters of glycols of general formula

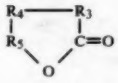


or

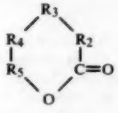


wherein R_1 and R_2 are alkyl groups having from 1 to 3 carbon atoms, equal to or different from each other, R_3, R_4, R_5, R_6, equal to or different from each other, are either alkyl groups containing from 1 to 3 carbon atoms or hydrogen atoms, m and n are integers which can have the value 0 or 1;

cyclic esters (lactones) of formula

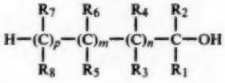


or



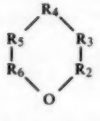
wherein R_2, R_3, R_4, R_5, equal to or different from each other, are alkylene groups wherein one or more hydrogen atoms can also be substituted by alkylic, alcoholic or ether groups;

alcohols of general formula



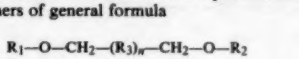
wherein R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8, equal to or different from each other, are alkyl groups having from 1 to 3 carbon atoms or hydroxy groups or hydrogen atoms, m, n and p are integers which can assume the values 0 and 1;

cyclic ethers such as



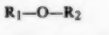
wherein R_2, R_5, R_6, equal to or different from each other, are alkyl groups wherein hydrogen can also be substituted by alkyl or methoxy groups, R_3 is either an oxygen atom or an alkylene group wherein hydrogen can also be substituted by alkyl or methoxy groups, R_4 is either equal to R_3 or can be absent in case of a pentaatomic ring;

ethers of general formula



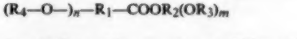
wherein R_1 is an alkyl group of from 1 to 4 carbon atoms, R_2 is either an alkyl group of from 1 to 4 carbon atoms or a hydrogen atoms, R_3 is either an alkylene group or $(CH_2—O—CH_2)$, n is an integer which can have the value 0 or 1;

ethers of general formula



wherein R_1 and R_2, either equal to or different from each other, are alkyl groups of from 1 to 4 carbon atoms, wherein one or more hydrogen atoms can be substituted by alcoholic groups;

ester-ethers, compounds containing both the functions, of formula:



wherein R_3 and R_4, equal to or different from each other, are alkyl groups having from 1 to 4 carbon atoms, R_2 is an alkylene group having from 1 to 4 carbon atoms, R_1 is either equal to R_2 or equal to R_3, m and n are integers which can have the value 0 or 1,

characterized in that the gas outcoming from one or more of the absorber towers is mixed once or more times with the solvent or solvents, the mixtures thus formed being then cooled, the solvent or solvents being thus separated from the same gas.

4,710,211

CRYOGENIC PROCESS FOR THE SELECTIVE REMOVAL OF ACIDIC GASES FROM MIXTURES OF GASES BY SOLVENTS

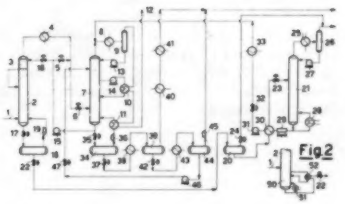
Luigi Gazzi, and Carlo Rescalli, both of Milan, Italy, assignors to Snamprogetti S.p.A., Milan, Italy

Filed May 16, 1986, Ser. No. 864,133

Claims priority, application Italy, May 24, 1985, 20887 A/85

Int. Cl.[4] F25J *3/02*

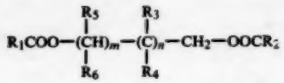
U.S. Cl. 62—17 **42 Claims**



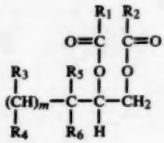
1. Cryogenic process for the selective removal of acidic gases from natural gases or from synthesis gases by adsorption in two towers and cooling of the gas outcoming from the first tower to the purpose of condensing a portion of the acidic gases contained in the same gas, characterized in that it uses a mixture constituted by one or more selective solvents selected among low molecular weight esters, alcohols and ethers of the following classes:

esters of alcohols of general formula R_1COOR_2, wherein R_1 and R_2 are alkyl groups of from 1 to 4 carbon atoms, equal to or different from each other, wherein one or more hydrogen atoms can be substituted by alcoholic groups;

esters of glycols of general formula

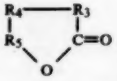


or

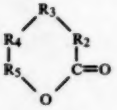


wherein R_1 and R_2 are alkyl groups having from 1 to 3 carbon atoms, equal to or different from each other, R_3, R_4, R_5, R_6, equal to or different from each other, are either alkyl groups containing from 1 to 3 carbon atoms or hydrogen atoms, m and n are integers which can have the value 0 to 1;

cyclic esters (lactones) of formula

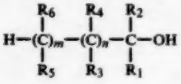


or



wherein R_2, R_3, R_4, R_5, equal to or different from each other, are alkylene groups wherein one or more hydrogen atoms can also be substituted by alkylic, alcoholic or ether groups;

alcohols of general formula



wherein R_1, R_2, R_3, R_4, R_5, R_6, equal to or different from each other, are alkyl groups having from 1 to 3 carbon atoms or hydroxy groups or hydrogen atoms, m and n are integers which can assume the values 0 or 1;

cyclic ethers such as

wherein R_2, R_5, R_6, equal to or different from each other, are alkylene groups wherein hydrogen can also be substituted by alkyl or methoxy groups, R_3 is either an oxygen atom or an alkylene group wherein hydrogen can also be substituted by alkyl or methoxy groups, R_4 is either equal to R_3 or can be absent in case of a pentaatomic ring;

ethers of general formula

$$R_1—O—CH_2—(R_3)_n—CH_2—O—R_2$$

wherein R_1 is an alkyl group of from 1 to 4 carbon atoms, R_2 is either an alkyl group of from 1 to 4 carbon atoms or a hydrogen atoms, R_3 is either an alkylene group or $(CH_2—O—CH_2)$, n is an integer which can have the value 0 or 1;

ethers of general formula

$$R_1—O—R_2$$

wherein R_1 and R_2, either equal to or different from each other, are alkyl groups of from 1 to 4 carbon atoms, wherein one or more hydrogen atoms can be substituted by alcoholic groups;

ester-ethers, compounds containing both the functions, of formula:

$$R_4—O)_n—R_1—COOR_2(OR_3)_m$$

wherein R_3 and R_4, equal to or different from each other, are alkyl groups having from 1 to 4 carbon atoms, R_2 is an alkylene group having from 1 to 4 carbon atoms, R_1 is either equal to R_2 or equal to R_3, m and n are integers which can have the value 0 or 1,

and by one or more organic compounds selected from:

heptane,

fractions of natural gasolines containing hydrocarbons having a number of carbon atoms comprised within the range of from 5 to 8;

monoaromatic compounds having a number of paraffinic carbon atoms comprised within the range of from 2 to 4, bound to the benzene ring either separately or as one or more linear or branched side chains;

dimethylethers of polyglycols having the glycolic unit $—CH_2—CH_2—O—$ repeated from once to five times;

methoxy- and/or ethoxyalcohols, wherein the alcoholic group is a radical having from 1 to 4 carbon atoms in either linear or branched chain.

4,710,212

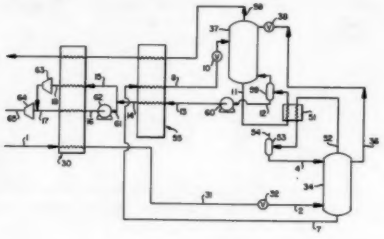
PROCESS TO PRODUCE HIGH PRESSURE METHANE GAS

Thomas C. Hanson, Buffalo; Theodore F. Fisher, Tonawanda, and Joseph A. Weber, Cheektowaga, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 24, 1986, Ser. No. 911,142

Int. Cl.[4] F25J *3/06*

U.S. Cl. 62—23 **9 Claims**



1. A process to produce high pressure methane gas comprising:

(A) cooling a gaseous feed comprising methane and nitrogen;

(B) introducing cooled feed into the higher pressure column of a double column cryogenic rectification plant and producing methane-rich liquid therein;

(C) withdrawing methane-rich liquid and passing said liquid into the lower pressure column of the double column rectification plant and producing methane liquid therein;

(D) partially vaporizing methane liquid by indirect heat

exchange with top vapor from the higher pressure column, passing the resulting vapor to the lower pressure column and pumping remaining methane liquid to a higher pressure;

(E) warming pumped methane liquid and further pumping at least a portion of the warmed methane liquid to a still higher pressure; and

(F) heating resulting higher pressure methane by indirect heat exchange with said cooling gaseous feed to produce high pressure methane gas.

4,710,213

PROCESS FOR SEPARATING CO_2 FROM A GASEOUS MIXTURE

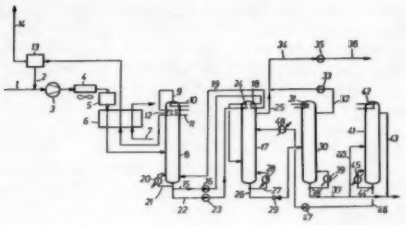
Rainer Sapper, Neuried, and Helmut Kick, Irschenhausen, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Mar. 20, 1986, Ser. No. 841,635

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1985, 3510097

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—28 **27 Claims**



1. In a process for separating CO_2 from a gaseous mixture containing CO_2 and light hydrocarbons by multistage distillation, wherein the gaseous mixture to be fractionated is separated in a first fractionating stage into overhead fraction containing essentially all of the C_1 and C_2 hydrocarbons, as well as a portion of the CO_2, and into a bottoms fraction containing essentially all of the C_{3+} hydrocarbons and the largest portion of the CO_2, and the bottoms fraction is separated, in a second fractionating stage, into a CO_2 fraction and into a C_{3+} hydrocarbon fraction, the improvement comprising that the second fractionating stage is operated under a higher pressure than the first fractionating stage, and at least part of the bottoms heating of the first fractionating stage is effected by liquid withdrawn from the bottoms, which liquid is heated while cooling the head of the second fractionating stage and is then recycled into the bottoms of the first fractionating stage.

4,710,214

PROCESS FOR SEPARATION OF HYDROCARBON GASES

Shanmuk Sharma, Houston; Donnie K. Hill, Woodlands, and Charles A. Durr, Houston, all of Tex., assignors to The M. W. Kellogg Company, Houston, Tex.

Filed Dec. 19, 1986, Ser. No. 944,272

Int. Cl.[4] F25J *3/02*

U.S. Cl. 62—28 **4 Claims**

1. A process for separation of a high pressure gaseous stream containing mixed light hydrocarbons which comprises:

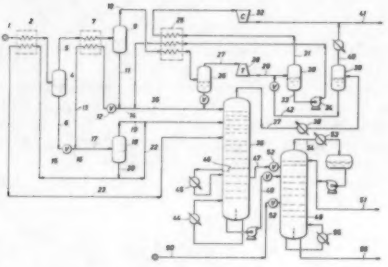
(a) expanding the high pressure gaseous stream to a first intermediate pressure and introducing the resulting expanded stream to a first single equilibrium separation zone;

(b) recovering a first vapor stream and a separate first liquid stream from the first single equilibrium separation zone;

(c) elevating the first liquid stream to a second intermediate pressure;

(d) recovering refrigeration from the first liquid stream at the second intermediate pressure through indirect heat exchange by cooling the high pressure gaseous stream prior to its expansion thereby forming a revaporized stream from the first liquid stream at the second intermediate pressure and introducing the revaporized stream to a multi-equilibrium separation zone;

(e) recovering and cooling an ethane-containing gaseous mixture from the multi-equilibrium separation zone;



(f) introducing the cooled ethane-containing gaseous mixture to a second single equilibrium separation zone;

(g) recovering a second vapor stream and a separate second liquid stream from the second single equilibrium zone; and

(h) expanding the second liquid stream into the first single equilibrium separation zone.

4,710,215

PROCESS FOR DISTILLATION-CRYSTALLIZATION OF ZINC CARBONATE

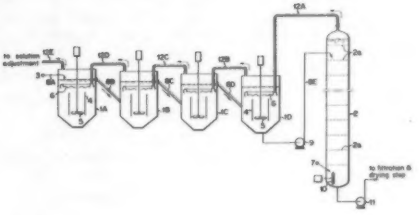
Tatsushi Kasai; Tatsuo Niikura; Masanori Sato, all of Tokyo; Takao Hashimoto, and Akiya Yamashita, both of Ibaraki, all of Japan, assignors to Tsukishima Kikai Co., Ltd., Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan

Filed Dec. 24, 1985, Ser. No. 813,103

Claims priority, application Japan, Dec. 28, 1984, 59-275231; Dec. 28, 1984, 59-275232; Dec. 28, 1984, 59-275233; Dec. 28, 1984, 59-275234; Dec. 28, 1984, 59-275236; Dec. 28, 1984, 59-275238

Int. Cl.[4] B01D *3/08*

U.S. Cl. 62—532 **11 Claims**



1. A process for the distillation-crystallization of basic zinc carbonate ($2ZnCO_3.3Zn(OH)_2$ or $ZnCO_3.3Zn(OH)_2.H_2O$) comprising:

feeding a basic zinc ammonium carbonate ($Zn(NH_3)_4CO_3$) solution to a crystallizer or crystallizers so as to effect a certain degree of crystallization and form a slurry or solution having crystals therein;

feeding the slurry or solution having crystals therein from a final crystallizer to a distillation column having a plurality of plates or trays so as to effect a final crystallization,

passing vapor generated by heat applied to a bottom portion of the distillation column through a top portion of the column to a preceding crystallizer or crystallizers sequentially; and

allowing the vapors to flow to a first crystallizer countercur-

rently with respect to the flow of the slurry or solution to the distillation column.

4,710,216

METHOD OF MAKING FLEXIBLE OPTICAL FIBER BUNDLE

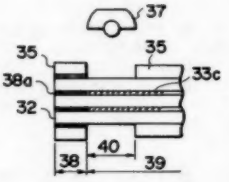
Yuho Harada; Tsutomu Maruyama; Yoshiyuki Kumakura, and Shigeo Kuwayama, all of Ohmiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Japan

Continuation of Ser. No. 485,285, Apr. 15, 1983, abandoned. This application Dec. 12, 1985, Ser. No. 808,226

Claims priority, application Japan, Apr. 19, 1982, 57-65064; Mar. 24, 1983, 58-49614

Int. Cl.[4] C03B *23/20, 37/10*

U.S. Cl. 65—4.1 **5 Claims**



1. A method of making a flexible optical fiber bundle, which comprises the steps of:

(i) forming an optical fiber bundle by bundling, heating and stretching a plurality of optical fibers each comprising a core glass, cladding glass having a refractive index lower than the refractive index of the core glass and coated on the core glass, and an acid-soluble borosilicate glass coated on the cladding glass;

(ii) covering at least a portion of said optical fiber bundle with an acid-resistant material;

(iii) treating the optical fiber bundle with an acid solution, then treating the optical fiber bundle with an alkali solution, and then treating the optical fiber bundle with an acid solution, thereby to remove acid-soluble borosilicate glass from the uncovered portion of the optical fiber bundle and form said uncovered portion into a flexible portion of the optical fiber bundle;

(iv) charging a photosetting plastic resin exhibiting little change in volume during curing into interstices among the individual fibers at a part of the flexible portion of the optical fiber bundle proximate an interface between at least one covered portion of said optical fiber bundle and the flexible portion thereof from which said acid-soluble borosilicate glass has been removed, exposing a predetermined length of the part of said optical fiber bundle charged with photosetting plastic resin to light, one end of said predetermined length abutting said interface, and removing photosetting plastic resin from such length of the resin-charged part of the optical fiber bundle not exposed to light, thereby to form a boundary at the end of said resin-charged part of the optical fiber bundle opposite that end abutting said interface; and

(v) forming a reinforcement around the periphery of at least a part of said bundle proximate said interface, by covering the periphery of at least a part of the bundle proximate said interface with a plastic resin of flexibility different from that of said plastic resin charged into said interstices among individual fibers of the optical fiber bundle.

4,710,217

BONDING GLASS-CERAMIC DENTAL PRODUCTS

Lorraine F. Bailey, Painted Post, N.Y., and Richard J. Bennett, Milford, Del., assignors to Corning Glass Works, Corning, N.Y.

Filed Mar. 10, 1986, Ser. No. 837,729

Int. Cl.[4] C03C *17/00;* **A61C** *5/08*

U.S. Cl. 65—31 **8 Claims**

1. A method for developing a bond exhibiting a shear strength in excess of 1200 psi between dental cements and etched fitting surfaces of dental appliances prepared from glass-ceramic materials wherein the exterior surface of the appliance is protected during the etching of the fitting surface, said method comprising the steps of:

(a) contacting at a temperature not exceeding about 150° F. the fitting surface of a dental appliance prepared from a glass-ceramic material consisting essentially, expressed in terms of weight percent on the oxide basis, of 10–18% K_2O, 14–19% MgO, 0–2% Al_2O_3, 0–7% ZrO_2, 55–65% SiO_2, and 4–9% F with an etchant in flowable gel form for a period of time adequate to promote differential etching of said fitting surface whereby the glass phase is removed to produce a tortuous path around the crystals of said glass-ceramic materials to provide a bonding surface having a depth of about 0.25–5 microns with holes resulting from said etching having diameters of about 0.35–10 microns dispersed throughout, said etchant consisting of an aqueous 5–20% NH_4HF_2 solution and said gel exhibiting a viscosity between 3000–8000 centipoises;

(b) removing the gelled etchant from the fitting surface of the appliance;

(c) contacting the etched surface of the appliance with a silane solution for a period of time adequate to promote impregnation of the holes in said surface;

(d) removing the excess silane solution from the etched surface and drying and curing the residual silane; and thereafter

(e) applying a dental cement to the etched surface and curing the cement in place.

4,710,218

TAKE-OUT TONG HEAD ASSEMBLY

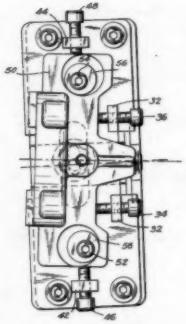
Serse Giberti-Fornaciari, Garza Garcia, Mexico, assignor to Vidriera Monterrey, S.A., Monterrey, Mexico

Filed Dec. 11, 1985, Ser. No. 808,354

Claims priority, application Mexico, Dec. 14, 1984, 203756

Int. Cl.[4] C03B *9/44*

U.S. Cl. 65—260 **3 Claims**



1. A take-out tong head assembly for a glass blowing machine of the type including tongs for gripping and holding a blown article during its transfer from a blow mold to a cooling plate, including:

at least one pair of tongs supported for movement towards

and away from each other on opposite sides of a central vertical axis;

means for effecting movement of said tongs to alternatively grip and release an article of blown glassware formed in said glass blowing machine;

a first support on which said tongs and said means for movement of said tongs are mounted;

a second support coupled to an arm of a take out mechanism, said arm being supported for oscillation angularly from the position of the blow mold to the position of cooling plate; and,

means for controllably adjusting the position of said first support relative to said second support for omnidirectional adjustment in a plane perpendicular to said vertical axis to permit co-axial alignment of said vertical axis to said tongs with a vertical axis of the blow mold in which said glass article has been formed.

4,710,219

PRODUCTION METHOD OF COMBINED PHOSPHORUS FERTILIZER AND SOIL CONDITIONER

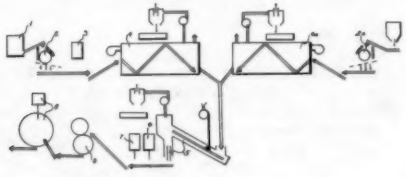
Arvo Wahlberg, deceased, late of Soukan Rantatie 16C, 02360 Espoo, Finland, and by Anna-Maija Wahlberg, heiress

Filed Apr. 17, 1986, Ser. No. 853,354

Claims priority, application Finland, Apr. 17, 1985, 85 1525

Int. Cl.[4] C05F *13/00*; C05B *17/00*

U.S. Cl. 71—11 **13 Claims**



1. A method for producing a combined phosphate fertilizer and soil conditioner without employing a mineral acid, which consists essentially of the steps of:

(a) grinding a moist, acidic, organic waste material having a pH less than 5, a water content of at least 40% and lower calcium and phosphorous contents than the calcium and phosphorous contents of phosphate rock;

(b) heating the acidic, organic waste material ground during step (a) to a temperature of 40° to 120° C. and at a pressure of 16 to 22 bar;

(c) grinding phosphate rock to a particle size of 0.02 to 1 mm;

(d) heating the phosphate rock ground during step (c) to a temperature of 50 to 800° C.;

(e) combining the ground, acidic, organic waste material obtained during step (b) as the sole acidic reactant with the ground phosphate rock obtained during step (d) at a pressure of 20 to 55 bar to permit the ground, acidic, organic waste material and the ground phosphate rock to collide, to cause disintegration of the phosphate rock; and

(f) cooling the mixture obtained during step (e) to 20° to 40° C. to obtain the desired product which contains almost all nutrient elements of phosphate rock.

4,710,220

BIOCIDAL PASTE

Hans Pischky, Lautertal, Fed. Rep. of Germany, assignor to Ciba-Geigy Corp., Ardsley, N.Y.

Filed Nov. 1, 1985, Ser. No. 793,867

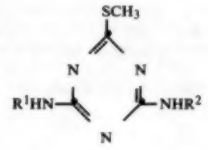
Claims priority, application Switzerland, Nov. 7, 1984, 5360/84

Int. Cl.[4] A01N *25/00*

U.S. Cl. 71—67 **8 Claims**

1. A water-free algicide preparation in paste form which consists essentially of:

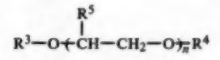
(a) an s-triazine of the formula I



(I)

wherein R^1 and R^2 independently of one another are each C_2–C_6-alkyl or C_3–C_6-cycloalkyl, and

(b) at least one polyethylene glycol/polypropylene glycol condensate or one compound of the formula II



(II)

wherein R^3 and R^4 independently of one another are each a monovalent acyl radical of a saturated or unsaturated C_6–C_{20}-carboxylic acid, or are hydrogen, C_1–C_{20}-alkyl or phenyl, or phenyl substituted by one or two C_1–C_{12}-alkyl groups, and R^5 is hydrogen or methyl, and wherein the index n is an integer between 1 and 10, and the weight ratio of component (a) to component (b) is 30:70 to 70:30.

4,710,221

HERBICIDAL SULFONAMIDES

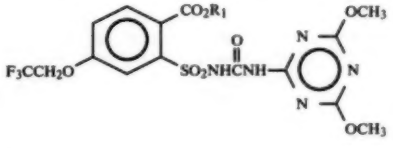
Craig L. Hillemann, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 720,702, Apr. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 613,412, May 24, 1984, abandoned. This application Nov. 22, 1985, Ser. No. 801,165

Int. Cl.[4] C07D *251/46*; A01N *43/66*

U.S. Cl. 71—93 **12 Claims**

2. A method for controlling the growth of undesired vegetation which comprises applying to the locus of a cotton crop an effective amount of the compound of the formula



wherein

R_1 is —CH_3 or —CH_2CH_3.

4,710,222

METHOD FOR REMOVAL OF PLUTONIUM IMPURITY FROM AMERICIUM OXIDES AND FLUORIDES

John R. FitzPatrick; Jerry G. Dunn, and Larry R. Avens, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 13, 1987, Ser. No. 14,324
Int. Cl.[4] C22B *60/02*; C01G *56/00*
U.S. Cl. 75—84.1 R 5 Claims

1. A method for the removal of plutonium impurity from oxides and/or fluorides of americium which comprises the steps of:

a. reacting impure americium oxides containing plutonium impurity with fluorine gas to produce impure AmF_4;

b. reacting the resulting impure AmF_4 with O_2F to produce PuF_6; and

c. separating the PuF_6 from the AmF_4.

4,710,223

INFILTRATED SINTERED ARTICLES

Daniel E. Matejczyk, Canoga Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 21, 1986, Ser. No. 842,580
Int. Cl.[4] B22F *3/00*
U.S. Cl. 75—248 16 Claims

1. In a method for preparing a sintered powdered metal article comprising mixing powdered metal with a binder, forming the mixture to a desired shape, removing the binder from the formed shape by solvent extraction to form a rigid skeletal article, the improvement comprising:

(i) sintering the rigid skeletal article to a specific predetermined density, less than theoretical density, and thereby forming interstices within the article, according to the following sequential steps:

(a) determining the article shrink factor as a function of initial batch composition, and as a function of article sintered density;

(b) sintering at a combination of time and temperature to produce a selected article shrinkage during sintering;

(c) using a refractory material fixture to further control article sintered dimensions;

(d) using a refractory material heat shield surrounding the article during sintering to minimize thermal stresses; and

(e) producing a rigid skeletal article having a density of from about 70% to about 90% of theoretical and a shrink factor of from about 10% to about 17% having final article dimensions controllable to about 1.0%;

(ii) infiltrating the skeletal article with a metal infiltrant according to the following steps:

(a) contacting the skeletal article with a metal infiltrant;

(b) heating the skeletal article and the metal infiltrant under a reducing atmosphere to a temperature which is at least the melting point of the metal infiltrant;

(c) maintaining the temperature for a time sufficient for the infiltrant to infiltrate the skeletal article;

(d) cooling the infiltrated skeletal article to solidify the metal infiltrant;

(iii) forming a metal infiltrant article; and

(iv) recovering the infiltrated article so formed.

4,710,224

PROCESS FOR INTRODUCING BATH COMPONENTS INTO ELECTROLYTIC AND CURRENTLESS BATHS

Hasso Kaiser, Schwabische Gmund, Fed. Rep. of Germany, assignor to DEGUSSA Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 586,264, Mar. 5, 1984, abandoned. This application May 6, 1987, Ser. No. 47,495
Claims priority, application Fed. Rep. of Germany, Mar. 5, 1983, 3307901
Int. Cl.[4] C23C *18/40*
U.S. Cl. 106—1.23 1 Claim

1. A process for introducing bath components into a currentless bath for the deposition of copper or deposition of copper layers, comprising introducing a water soluble reducing agent which is hydrazine and together with an inert gas into the bath and admixing the bath components by flowing said gas.

4,710,225

REFRACTORY CEMENT

Robert A. Rucker, 25 Timberlake Dr., Orchard Park, N.Y. 14127

Filed May 23, 1986, Ser. No. 866,275
Int. Cl.[4] C04B *7/32*
U.S. Cl. 106—104 10 Claims

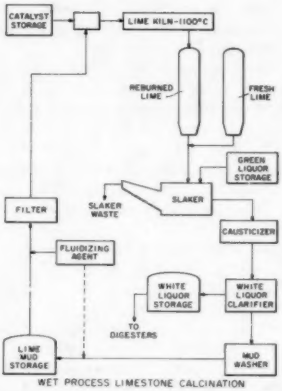
1. A refractory cement comprising refractory clay, ball clay and calcium aluminate cement mixed together in such amounts that said refractory cement is adapted to be air-cured to a hardened condition and which is non water soluble when in a hardened, cured condition, the refractory cement having a Tyler screen analysis of about 2 percent to 6 percent +40 mesh, 20 percent to 35 percent +70 mesh, 10 percent to 15 percent +100 mesh and 40 percent to 60 percent −100 mesh, the percentage by weight of the refractory clay in the composition of said refractory cement is in the range from about 50 percent to 70 percent, and the percentage by weight of the ball clay in the composition of said refractory cement is in the range from about 10 percent to 30 percent.

4,710,226

FLUIDIZATION OF LIMESTONE SLURRIES AND RESULTANT PRODUCTS

William A. Mallow, Helotes, Tex., assignor to Southwest Research Institute, San Antonio, Tex.

Filed Apr. 8, 1986, Ser. No. 849,384
Int. Cl.[4] C04B *2/06*
U.S. Cl. 106—119 10 Claims



WET PROCESS LIMESTONE CALCINATION

1. The method of treating a limestone slurry to remove water therefrom comprising admixing therewith at least about 0.25 part by weight of a fluidizing agent for each 100 parts by

weight of solids in said slurry, said fluidizing agent consisting essentially of a micelle-forming surfactant and a protective colloid in a ratio of from about 2:1 to 1:2 by weight, and then removing water from the slurry.

8. A fluidizing agent for dewatering a limestone slurry consisting essentially of a micelle-forming surfactant capable of coating lime and a protective colloid selected from a mixture of linolenic and oleic acids and rosen acids and mixtures of fatty acids in a ratio of from about 2:1 to 1:2.

4,710,227

DISPERSION PROCESS FOR CERAMIC GREEN BODY

A. Dale Harley, Midland, Mich.; Lawrence G. Duquette, Maynard, Mass.; Issam A. Khoury, Southboro, Mass., and Iwao Kohatsu, Lexington, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 28, 1986, Ser. No. 856,879

Int. Cl.[4] C08L *1/08;* **C03C** *3/00;* **C04B** *35/46*

U.S. Cl. 106—193 R **63 Claims**

1. A process comprising:

(a) forming a hydrolyzable solution of a first group of alkoxides comprising at least one compound characterized as $A(OR)_x$,

wherein A is at least one metal selected from the group consisting of Be, Mg, Ca, Sr, Ba, Ge, Pb, Sb and Bi,

a second group of alkoxides comprising at least one compound characterized as $B(OR)_x$,

wherein B is at least one metal selected from the group consisting of Ti, Zr, Sc, Y, La, Nb, Fe, Ta, W, Mn, Sn, Mg, and Zn, and

wherein R is a compound characterized as C_yH_z wherein

y is an integer from 1 to 10,

z is an integer selected from the group consisting of 2y, 2y+1 and 2y−1, and

x is an integer from 1 to 7,

such that said first and second groups of alkoxides are suitable to be hydrolyzed to form a compound characterized as ABO_3,

and an alcohol suitable to dissolve said first and second groups of alkoxides;

(b) hydrolyzing said hydrolyzable solution to form a hydrolyzed dispersion of said compound characterized as ABO_3 in said alcohol;

(c) concentrating at least a portion of said dispersion to a sediment;

(d) admixing a binder solution, a plasticizer, and a release agent with said sediment to make a ceramic slip formulation; and

(e) preparing a ceramic green body from said slip formulation.

4,710,228

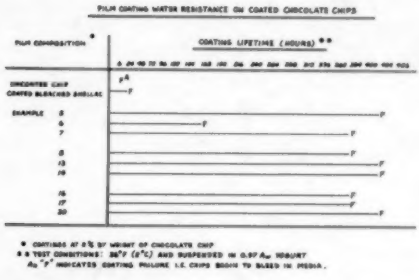
EDIBLE COATING COMPOSITION AND METHOD OF PREPARATION

Jonathan Seaborne, Corcoran, and David C. Egberg, Plymouth, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Oct. 16, 1985, Ser. No. 788,178

Int. Cl.[4] C08L *89/00;* **C09F** *1/00;* **C08G** *8/34*

U.S. Cl. 106—218 **12 Claims**



1. An edible coating polymer having a low water vapor permeability, comprising the heat cured reaction product of:

a refined, carbon filtered, unbleached, edible, virgin shellac, and wherein the product has an average molecular weight ranging from bout 1,500 to 6,000

4,710,229

POWDERED BITUMEN CONCENTRATE AND ITS USE

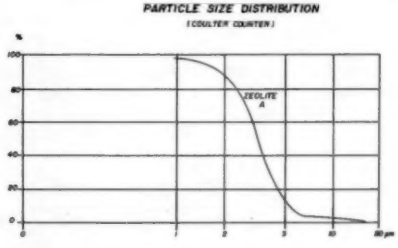
Karl H. Muller, Bruchkobel, and Walter Barthel, Langenselbold, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 10, 1986, Ser. No. 827,719

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1985, 3505051

Int. Cl.[4] C08L *95/00*

U.S. Cl. 106—281 R **14 Claims**



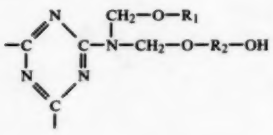
1. A powdered bitumen concentrate containing a mixture consisting of bitumen, synthetic silica and at least one synthetic zeolite.

4,710,230
PIGMENT PASTE

Noboru Okoshi, Sodegaura; Masatoshi Motomura, Ichihara; Mitsuru Ohtsubo, Kisarazu, and Takenori Ikeda, Ichihara, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed Apr. 21, 1986, Ser. No. 854,398
Claims priority, application Japan, Apr. 25, 1985, 60-89286
Int. Cl.[4] C09C *3/00*
U.S. Cl. 106—308 N **10 Claims**

1. A pigment paste comprising a pigment and as a pigment dispersing agent, a compound having a basic structure represented by the following formula



wherein R_1 represents a hydrogen atom or a C_1–C_4 alkyl group, and R_2 represents a residue of a diol or polyol, or a mixture of said pigment dispersing agent and an organic solvent, said pigment being dispersed in said pigment dispersing agent or in said mixture in an amount such that the pigment weight concentration (PWC, weight %) as defined by

$$PWC\ (\%) = \frac{\text{Weight of the pigment}}{\text{Weight of the pigment dispersing agent + solids weight of the pigment}} \times 100$$

is 0.5 to 99.5% by weight.

4,710,231
SOLID FRUCTOSE

John R. Bateman, Frilsham; Brita C. Goodacre, Sonning, and Alan Smithson, Reading, all of England, assignors to Tate & Lyle Public Limited Company, England

Filed Jan. 6, 1984, Ser. No. 568,584
Claims priority, application United Kingdom, Jan. 7, 1983, 8300333; Nov. 7, 1983, 8329647
Int. Cl.[4] F24B *3/00*
U.S. Cl. 127—30 **19 Claims**

1. A process for producing solid fructose, said process comprising dispersing a fructose syrup of at least 80 Brix and at least 90% fructose on a dry solids basis in an alcoholic medium to give solid fructose, said dispersion being effected at high shear of 2,000 to 200,000 s^{-1} and said alcoholic medium being one in which fructose is soluble to the extent of 1 to 10 wt% at the temperature at which said syrup is dispersed in said alcoholic medium, said temperature being from 20 to 55 degrees C. and the medium to syrup ratio being up to 3 ml/g.

4,710,232
PROCESS FOR CLEANING METAL ARTICLES

John A. Tahbaz, 5396 Willow La. #E, Murray, Utah 84107

Filed Jun. 1, 1984, Ser. No. 616,203
Int. Cl.[4] B08B *3/12*
U.S. Cl. 134—1 **12 Claims**

1. A process for cleaning metal articles which have an undesirable, dirty residue left on the surfaces thereof resulting from previous metal working operations to which the metal articles have been subjected, said process comprising the steps of

mixing an alkaline cleaner and an emulsion cleaner with water to form a cleaning solution mixture, wherein said alkaline cleaner comprises a soluble salt selected from the group consisting of alkaline carbonats, alkaline silicates, alkaline phosphates, alkaline sulfates, alkaline borates, caustic soda, caustic potash and mixtures thereof, and said emulsion cleaner comprises about 1 to 30% water, about 1 to 10% surfactant, and the remainder being an organic solvent consisting essentially of one or more organic compounds selected from the group consisting of aliphatic hydrocarbons, aromatic hydrocarbons, ketones, aldehydes, alcohols, glycols, glycol ethers, and mixtures thereof wherein the organic compounds in said group are further limited to those containing from 4 to 16 carbon atoms, and with the surfactant being anionic, nonionic, cationic or amorphic and selected from the group consisting essentially of sulfated hydrocarbons, sulfonated hydrocarbons, ethoxylated hydrocarbons, ethoxylated alcohols, saponified fatty acids, polymerized fatty acids, quaternary ammonium compounds, amines, amide condensates and mixtures thereof, said cleaning solution mixture containing from about 1 to 6 ounces of said alkaline cleaner and from about 1 to 6 ounces of emulsion cleaner per gallon of water in the mixture, and

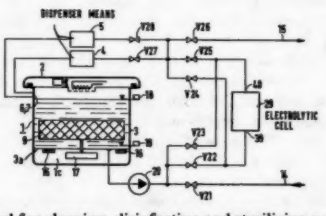
imtimately contacting the surfaces of the metal articles with the mixture of alkaline cleaner and emulsion cleaner at a temperature within the range of about 4° C. and 40° C. and for a time sufficient to clean the dirty residues from the surfaces of the metal articles.

6. A process in accordance with claim 1, wherein the metal articles are sprayed with the mixture of alkaline cleaner and emulsion cleaner during the contacting step.

4,710,233
METHOD AND APPARATUS FOR CLEANING, DISINFECTING AND STERILIZING MEDICAL INSTRUMENTS

Eugen Hohmann, Bensheim; Konrad Mund, Uttenreuth, and Erhard Weidlich, Spardorf, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 15, 1985, Ser. No. 765,948
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1984, 3430605
Int. Cl.[4] B08B *3/12*
U.S. Cl. 134—1 **27 Claims**



1. A method for cleaning, disinfecting and sterilizing a medical instruments, said method comprising the steps of:

providing a container for receiving a fluid bath, and introducing the instruments into the container;

filling the container with a fluid and a cleaning agent to form a first fluid bath receiving the instruments to be cleaned;

precleaning the instruments by subjecting the first fluid bath in the container to ultrasonic energy for a period of time T1;

emptying the first fluid bath from the container and filling said container with a second fluid bath containing both a cleaning agent and sodium chloride;

fine cleaning and sterilizing the instruments in the second fluid bath for a time period T2 by subjecting the second of fluid bath to ultrasonic energy, and circulating the second fluid bath through an electrolytic cell operating on a voltage to create an electrolytic disassociation therein;

emptying the second fluid bath from the container and filling said container with a rinsing fluid bath;

rinsing the instrument for a time period T3 by subjecting the

rinsing bath to the ultrasonic energy and circulating the rinsing bath through the electrolytic cell;

subsequently emptying the rinsing bath; and

drying the instruments for a time period T4 by subjecting the instruments to heated air.

10. An apparatus for cleaning, disinfecting and sterilizing medical instruments, said apparatus comprising a housing, a container positioned in the housing for receiving the instruments to be processed and for receiving a fluid bath, an electrolytic cell, drying means for drying the instruments in the container, an ultrasonic means having at least one ultrasonic transducer coupled to the container for applying ultrasonic energy to a fluid in the container, hydraulic control means for controlling the filling and draining of the container, and including lines extending between the container and the electrolytic cell, and an electrical control means for controlling the operation of the ultrasonic means, the electrolytic cell, the drying means and the hydraulic circuit.

4,710,234
PROCESS FOR MANUFACTURING AN ANTI-BLOOMING DIODE ASSOCIATED WITH A SURFACE CANAL

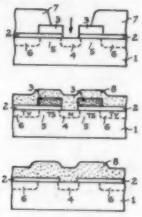
Pierre Blanchard, Verrieres le Buisson, France, assignor to Thomson—CSF, Paris, France

Filed Feb. 25, 1986, Ser. No. 833,733

Claims priority, application France, Mar. 8, 1985, 85 03447

Int. Cl.⁴ H01L *21/265*; G11C *19/28*

U.S. Cl. 437—40 **2 Claims**



1. A process for manufacturing an anti-blooming diode associated with a surface canal gate of a frame transfer matrix comprising the steps of depositing a first layer of a dielectric material on a silicon substrate then depositing a second polycrystalline silicon layer on this first layer, etching by a photolithographic process the second silicon layer so as to bare the dielectric layer in two zones, a first zone defining the space for formation of the diode, a second zone defining a volume canal zone, a third zone defining the surface canal being protected by the remaining silicon, implanting impurities in the volume transfer canal zone and masking the volume transfer canal zone while leaving the zone reserved for the diode uncovered so as to bare the substrate in the zone reserved for the diode and depositing a second polycrystalline silicon layer on the whole formed by the bared part of the substrate, the second silicon layer and the dielectric and etching the second of the two silicon layers so as to form the gate.

4,710,235
PROCESS FOR PREPARATION OF LIQUID PHASE BONDED AMORPHOUS MATERIALS

David M. Scruggs, San Juan Cap., Calif., assignor to Dresser Industries, Inc., Dallas, Tex.

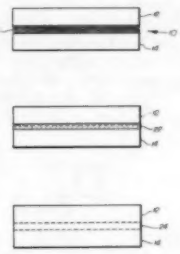
Filed Mar. 5, 1984, Ser. No. 586,199

Int. Cl.⁴ C23C *10/00*

U.S. Cl. 148—4 **11 Claims**

1. A process for bonding together a first solid piece and a second solid piece to form a bonded piece, the first piece being an amorphous metal, comprising the steps of:

placing an interlayer material between the two solid pieces, the interlayer material having a solidus temperature less than the crystallization temperature of the first piece and a composition which is diffusionally compatible with the first piece, and wherein the interlayer material is an alloy of aluminum and at least one other element, the other element being selected from the group consisting of silicon, germanium, silver and gold; and



hot pressing the two pieces with the interlayer material therebetween at a temperature greater than the solidus temperature of the interlayer material and less than the crystallization temperature of the first piece whereby the interlayer material interdiffuses with the amorphous metal without inducing crystallization of the interdiffused portion of the amorphous metal.

4,710,236
METHOD FOR THE PREPARATION OF A METALLIC BODY FROM AN AMORPHOUS ALLOY

Ludwig Schultz, Bubenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 7, 1986, Ser. No. 848,984

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 3515167

Int. Cl.⁴ C22C *1/00*

U.S. Cl. 148—11.5 P **22 Claims**

1. In a method for manufacturing an amorphous metal alloy body including the steps of:

forming an intermediate product of at least a first alloy component and a second alloy component in powder form wherein each alloy component in the intermediate product has at least one dimension of at most about 1 μm in extent said forming step including a compacting step; and

converting the intermediate product into a body having an amorphous metal alloy structure by a diffusion reaction at a predetermined elevated temperature;

the improvement comprising:

producing a mixture powder by milling a mixture of at least said first alloy component powder and said second alloy component powder and terminating the milling at a time so that the particles of the produced mixture powder are formed of predominately layer-like structures of said at least said first and second alloy components; and then effecting said compacting step by compacting and deforming the produced mixture powder to form the intermediate product having a predetermined shape.

4,710,237
METHOD FOR THERMAL TREATMENT OF NICKEL BASED ALLOY MATERIALS

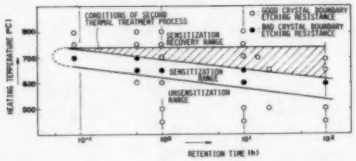
Toshio Yonezawa; Nobuya Sasaguri; Kichiro Onimura; Hiroshi Susukida; Katsuji Kawaguchi, all of Takasago; Hiroo Nagano, Kobeshi; Takao Minami, Amagasakishi; Kazuo Yamanaka, Monooshi; Yasutaka Okada, Narashi, and Mamoru Inoue, Kobeshi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Sumitomo Metal Industries, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 550,024, Nov. 8, 1983, abandoned. This application Jan. 2, 1986, Ser. No. 815,774

Claims priority, application Japan, Nov. 10, 1982, 57-197362

Int. Cl.[4] C22F *1/10*

U.S. Cl. 148—13 **2 Claims**



1. A method for the thermal treatment of a nickel based alloy comprising the steps of:

(1) heating in a furnace an alloy consisting essentially of
58 to 64% by weight Ni,
25 to 35% by weight Cr,
not more than 0.003% by weight boron,
0.012 to 0.035% by weight C,
not more than 1% by weight Mn,
not more than 0.5% by weight Si,
not more than 0.015% by weight P,
not more than 0.015% by weight S,
with the remainder being Fe
at a temperature from T° C. to (T+100)° C. to thoroughly solubilize the carbide in the alloy and cooling the thus treated alloy at a cooling rate which is at least as fast as the cooling rate of the furnace in which the alloy was heated; and

(2) heating the thus cooled alloy in the sensitization recovery range as defined in FIG. 2 at a temperature in the range from 600° to 750° C. for a period of from 0.1 to 100 hours and then cooling the thus treated alloy at a cooling rate which is at least as fast as the cooling rate of the furnace in which the alloy was heated.

4,710,238
MAKING OF STEEL COMPONENT

Cyril Dawes, Sutton Coldfield, and Donald F. Tranter, Evesham, both of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

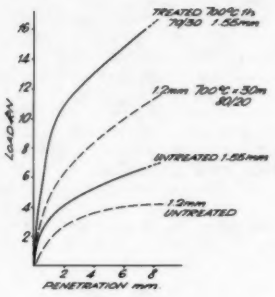
Filed Feb. 4, 1986, Ser. No. 825,890

Claims priority, application United Kingdom, Feb. 20, 1985, 8504349

Int. Cl.[4] C21D *1/74*

U.S. Cl. 148—16.6 **11 Claims**

1. A method of treating a component of steel by nitriding the component to form a epsilon iron nitride surface layer, the nitriding being carried out by heating the component in a gaseous atmosphere containing a nitrogen donor, the heat treatment being performed at a temperature of from about 500° C. to about 740° C. for a period of about 30 minutes to about 4 hours wherein (i) the component is formed of an interstitial-free steel and has a thickness of at least 0.5 mm, and (ii) the concentration of nitrogen donor in the gaseous atmosphere is sufficient to form the epsilon iron nitride surface layer and



below the surface layer, a layer of nitrides of the trace alloy elements of the interstitial-free steel.

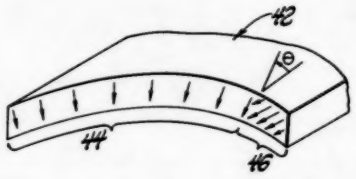
4,710,239
HOT PRESSED PERMANENT MAGNET HAVING HIGH AND LOW COERCIVITY REGIONS

Robert W. Lee, Troy, Mich., and Neal A. Schaffel, Noblesville, Ind., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 650,623, Sep. 14, 1984, abandoned. This application Aug. 18, 1986, Ser. No. 897,591

Int. Cl.[4] H01F *1/02*

U.S. Cl. 148—101 **5 Claims**



1. A method of making a permanent magnet body comprising first and second regions spaced along a surface dimension of the body that differ in magnetic alignment, the method comprising

hot pressing magnetically isotropic particles of a composition comprising iron, neodymium and/or praseodymium, and boron to form a substantially fully densified body of the composition, and

hot working the body nonuniformly to produce at least two regions in the body spaced along a surface dimension of it that differ in magnetic alignment.

4,710,240
ANNEALING STEEL STRIP

Klaus Frommann, Meerbusch, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Mar. 14, 1986, Ser. No. 840,322

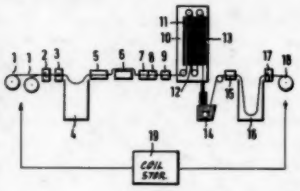
Claims priority, application Fed. Rep. of Germany, Mar. 20, 1985, 3510050

Int. Cl.[4] C21D *9/52*

U.S. Cl. 148—156 **2 Claims**

1. In a method of annealing cold rolled steel strip wherein the strip is uncoiled, cleaned, and passed into and through continuously operating annealing furnace wherein the strip is heated to and held at a relatively hot temperature, said strip after leaving the furnace being subsequently quenched, the

improvement comprising: drying and coiling said strip; passing the strip again through the same equipment including additionally pickling of removing an oxide layer; and



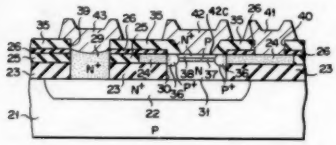
passing the strip a second time through the annealing furnace, while operating said annealing furnace for heating to and holding at a lower temperature said relatively hot temperature to obtain aging and coiling the strip again.

4,710,241

METHOD OF MAKING A BIPOLAR SEMICONDUCTOR DEVICE

Shigeru Komatsu, Kitakyushu, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 8, 1986, Ser. No. 817,103
Claims priority, application Japan, Jan. 17, 1985, 60-6218
Int. Cl.[4] H01L *21/36, 21/38, 21/42, 21/00*
U.S. Cl. 437—162 **7 Claims**



7. A method of manufacturing a semiconductor device, comprising the steps of:

selectively forming a buried layer of a second conductivity type in a surface region of a semiconductor substrate of a first conductivity type;

forming at least one insulating film on the semiconductor substrate;

forming at least one first opening on a portion of the buried layer in the insulating film;

forming a collector connection layer of the second conductivity type in the first opening and connected to the buried layer;

forming at least one second opening on the buried layer and in the insulating film;

forming a monocrystalline silicon layer of the second conductivity type in the second opening and connected to the buried layer, said monocrystalline layer being formed after forming said collector connection layer;

forming a base of the first conductivity type in the monocrystalline silicon layer by a heat treatment at a temperature of less than 1,000° C. and forming a collector in the remaining portion of the monocrystalline silicon layer; and

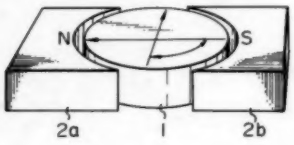
selectively forming an emitter of the second conductivity type in the base by annealing at a temperature less than 1,000° C.

4,710,242

MATERIAL FOR TEMPERATURE SENSITIVE ELEMENTS

Wataru Yamagishi, Kawasaki, and Masato Sagawa, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 480,031, Mar. 29, 1983, abandoned, which is a continuation of Ser. No. 290,973, Aug. 7, 1981, abandoned. This application Jun. 3, 1986, Ser. No. 871,175
Claims priority, application Japan, Nov. 8, 1980, 55-109129
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—301 **5 Claims**



1. A temperature sensitive element which comprises a sintered powder of fine grains consisting of a spin reorientation type ferromagnetic material having a transition temperature range T_2-T_1 defined between transition beginning and ending temperatures T_1, T_2, below which transition beginning temperature T_1 the easy direction of magnetization of said material is in a first predetermined crystallographic direction and above which transition ending temperature T_2 the easy direction of magnetization is in a second predetermined crystallographic direction that is perpendicular to the first predetermined crystallographic direction, said material having the formula:

$$Nd_{1-u}R_u(Co_{1-x}M_x)_z$$

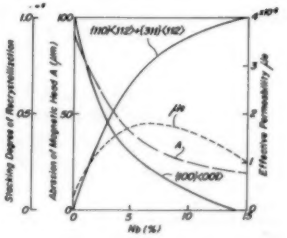
wherein R is one element selected from the group consisting of Sm and Pr, M is Al or Al and Fe, $0 \leqq u \leqq 0.5$, $0 < x < 0.4$, and $4.4 \leqq z \leqq 5.5$.

4,710,243

WEAR-RESISTANT ALLOY OF HIGH PERMEABILITY AND METHOD OF PRODUCING THE SAME

Hakaru Masumoto, Sendai, and Yuetsu Murakami, Izumi, both of Japan, assignors to The Foundation: The Research Institute of Electric and Magnetic Alloys, Japan

Filed Jul. 29, 1985, Ser. No. 760,038
Claims priority, application Japan, Jan. 30, 1985, 60-14556
Int. Cl.[4] H01F *1/04*
U.S. Cl. 148—312 **3 Claims**



1. A wear-resistant alloy having a high permeability, comprising by weight about 60–90% of Ni, about 0.5–14% of Nb, and a remainder being Fe with unavoidable impurities, and having an effective permeability of at least about 3,000 at 1 KHz, a saturation magnetic flux density of at least about 4,000 G, and a recrystallized texture of {110}<112>+{31-1}<112>.

4,710,244
DREDGER TEETH

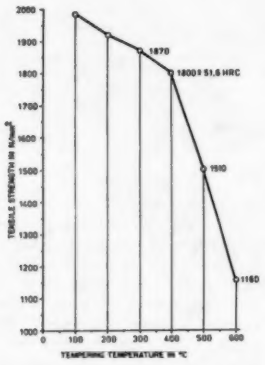
Heinz Lepand; Margrit Hüser; Franz-Josef Biniasz, and Axel Fuchs, all of Dortmund, Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 718,168, Apr. 1, 1985, abandoned. This application Nov. 4, 1986, Ser. No. 928,615

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1984, 3412405

Int. Cl.[4] C22C *38/18*

U.S. Cl. 148—333 **4 Claims**



1. A wear resistant and temper resisting steel which has been forged, hardened and tempered for use as a work material in dredger teeth, said steel consisting of:

0.30–0.40%	carbon
1.0–1.60%	silicon
0.50–0.80%	manganese
2.0–2.6%	chromium
maximum 0.025%	phosphorus
maximum 0.025%	sulfur, and

the remainder iron and contaminants in normal quantities.

4,710,245
METHOD OF MAKING TUBULAR UNITS FOR THE OIL AND GAS INDUSTRY

Kurt Roether, Duesseldorf, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 9, 1985, Ser. No. 806,764

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3445371

Int. Cl.[4] C21D *9/08*

U.S. Cl. 148—12.4 **4 Claims**

1. A method of making tubing and pipes for conduction in the oil and gas industry or for use as drillpipes, wherein such tubing is connected at both ends with connector sleeves by means of welding, the welding seam being deburred thereafter and the unit so produced being heat treated and subjected to cutting, the improvement comprising:

providing tubing, pipes or drill pipes as well as connector sleeves made of steel consisting essentially of the following composition, all percentages by weight, between 0.2 and 0.6% carbon, between 0.5 and 1.8% manganese, between 0.5 and 3.5% combined chromium and molybdenum, not more than 0.2% phosphorus and not more than 0.005% sulphur;

heat treating by quenching and tempering the combined unit of tubing and two welded on connectors to obtain the following properties: yield strength between 515 to 760 N/square mm, tensile strength at least 660 N/square mm, elongation at least 15.5%, hardness not more than 26 HRC, impact notch ductility at room temperature in accordance with ISOV of at least 60 Joules, long duration strength tested for more than 720 hours in accordance with NACE-TM-01-77 in a hydrogen sulfide saturated test solution at a load of not less than 80% of said minimum yield strength.

4,710,246
AMORPHOUS ALUMINUM-BASED ALLOYS

Gerard Le Caer, Nancy, and Jean-Marie Dubois, Pompey, both of France, assignors to Centre National de la Recherche Scientifique "CNRS", Paris, France

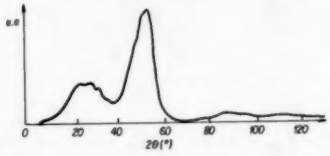
Continuation-in-part of Ser. No. 506,993, Jun. 23, 1983, Pat. No. 4,595,429. This application Sep. 27, 1984, Ser. No. 655,167

Claims priority, application France, Jul. 6, 1982, 82 12404

The portion of the term of this patent subsequent to Jun. 17, 2003, has been disclaimed.

Int. Cl.[4] C22C *21/00*

U.S. Cl. 148—403 **2 Claims**



1. A substantially amorphous Al-based alloy, wherein said Al-based alloy is represented by the formula:

$$Al_aM_bM'_cX_dY_e$$

in which:

$a+b+c+d+e=100$

$50 \leqq a \leqq 95$ atom %

$0 \leqq b \leqq 40$ atom %

$0 \leqq c \leqq 15$ atom %

$0 \leqq d \leqq 20$ atom %

$0 \leqq e \leqq 3$ atom %

wherein

at least two of the subscripts b, c or d are strictly positive, and wherein M is at least one metal selected from the group consisting of Mn, Ni, Cu, Zr, Cr, Ti, V, Fe and Co;

M' is Mo, W, or a mixture thereof

X is at least one element selected from the group consisting of Ca, Li, Mg, Ge, Si, and Zn; and

Y is the inevitable production impurities, with the proviso that when element M is Co, Mn and/or Ni, the total amount of these elements is at least 12 wt % of the alloy.

4,710,247

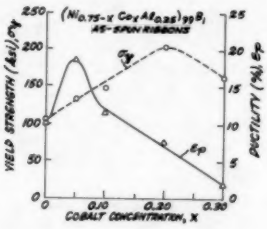
RAPIDLY SOLIDIFIED TRI-NICKEL ALUMINIDE BASE ALLOY

Shyh-Chin Huang, Latham; Keh-Minn Chang, and Alan I. Taub, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 647,326, Sep. 4, 1984, abandoned. This application Mar. 14, 1986, Ser. No. 839,659

Int. Cl.[4] C22C *19/00*

U.S. Cl. 148—429 **10 Claims**



1. A rapidly solidified tri-nickel aluminide base alloy having a crystal structure of the $L1_2$ type, said alloy comprising a composition having the formula

$$(Ni_{0.75-x}Co_xAl_{0.25})_yB_{100-y},$$

wherein the x is between 0.25 and 0.15, and the y is between 97.5 and 99.9, and

said alloy having a tensile strength of at least 100 ksi.

4,710,248

EMULSION EXPLOSIVE COMPOSITION

David E. Yates, and Stuart W. Dack, both of Melbourne, Australia, assignors to ICI Australia Limited, Victoria, Australia

Filed Aug. 21, 1986, Ser. No. 898,674

Claims priority, application Australia, Aug. 21, 1985, PH2061

Int. Cl.[4] C06G *45/00*

U.S. Cl. 149—21 **23 Claims**

1. An emulsion explosive composition comprising a discontinuous oxidizer-phase containing an oxygen-supplying component and an organic-fuel medium forming a continuous phase wherein the oxygen-supplying component and organic-fuel medium are emulsified in the presence of a modifier comprising a hydrophilic moiety and a lipophilic moiety wherein the hydrophilic moiety comprises a carboxylic acid or a group capable of hydrolyzing to a carboxylic acid group, and wherein the lipophilic moiety is a saturated or unsaturated hydrocarbon chain, and wherein the said emulsion explosive composition pH, being the pH of the said oxidizer phase, is above 4.5.

4,710,249

TIRE REPAIR METHOD

Simon Roberts, 30543 Shoreham, Southfield, Mich. 48076

Division of Ser. No. 592,506, Mar. 26, 1984, Pat. No. 4,579,161. This application Jul. 2, 1985, Ser. No. 751,296

Int. Cl.[4] B60C *21/06*; G01B *5/12*

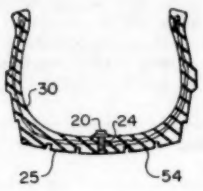
U.S. Cl. 156—64 **9 Claims**

1. A method of repairing and sealing a puncture of a tire comprising:

(a) inserting into a tire puncture alternate rigid slender rod shaped members to measure the size of said tire puncture, said rigid rod members being indexed to corresponding sizes of a series of resilient plug type closures;

(b) selecting a corresponding size closure from the series of closures;

(c) engaging a tool with the closure; and



(d) forcibly inserting the closure into the puncture by using the tool.

4,710,250

METHOD FOR PRODUCING A PACKAGE FOR A SEMICONDUCTOR DEVICE

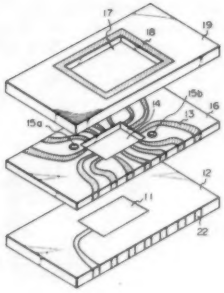
Haruo Kojima, Yokohama, and Hidehiko Akasaki, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 439,593, Nov. 5, 1982, abandoned. This application Feb. 11, 1986, Ser. No. 809,796

Claims priority, application Japan, Nov. 6, 1981, 56-177888

Int. Cl.[4] B32B *31/14*

U.S. Cl. 156—89 **6 Claims**



1. A method for producing a package for a semiconductor device by sequentially laminating three ceramic green sheets and firing the laminated ceramic green sheets, the package facilitating the mounting of a semiconductor chip thereon, comprising the steps of:

(a) providing a first green sheet having a chip stage on the upper surface thereof;

(b) providing a second green sheet having an internal conductor pattern on at least the upper surface thereof and by using a single mold, simultaneously forming therein, a chip-inserting window and at least two marks, the window being formed in the second green sheet at a predetermined location as required for exposing the surface of the chip stage of the first green sheet when the first and second green sheets are subsequently laminated, and the marks being provided at predetermined, respective positions relative to the location of the first chip-inserting window for subsequent detection and recognition, thereby, of the location of the first chip-inserting window;

(c) superimposing the second green sheet on the first green sheet and laminating the second green sheet to the first green sheet;

(d) providing a third green sheet and forming a second chip-inserting window at a predetermined location therein as required, when the third green sheet is subsequently

laminated with the first and second laminated green sheets, for exposing the first chip-inserting window, the marks, and a predetermined portion of the internal conductor pattern located adjacent to the periphery of the first chip-inserting window, said exposed, predetermined portion of the internal conductor pattern of said second green sheet functioning as a wire-bonding area, and the predetermined location of the marks being selected so as to form the marks in the wire-bonding area of the second green sheet;

(e) superimposing the third green sheet on the second green sheet and laminating the third green sheet to the second green sheet;

(f) firing the laminated creamic green sheets; and

(g) in preparation for inserting a semiconductor chip through the first and second chip-inserting windows and mounting same on the chip stage of the first sheet, recognizing the location of the first chip-inserting window by means of the marks.

4,710,251

PROCESS FOR MANUFACTURING ENDLESS BELTS

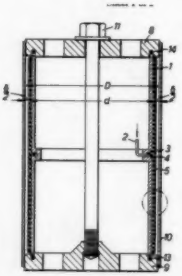
Horst Borchardt, Höxter, Fed. Rep. of Germany, assignor to Arntz-Optibelt-KG, Hoxter, Fed. Rep. of Germany

Filed May 17, 1984, Ser. No. 611,172

Claims priority, application Fed. Rep. of Germany, May 20, 1983, 3318470

Int. Cl.[4] F16G *5/00*

U.S. Cl. 156—137 **5 Claims**



1. A process of manufacturing virtually inextensible endless drive belts of natural or synthetic rubber including stability supports of synthetic polymers extending substantially longitudinally of the endless drive belts, said process including the steps of constructing a belt sleeve, vulcanizing the belt sleeve while supported on a tubular former, radially stretching the belt sleeve on said tubular former immediately after vulcanization while the belt sleeve retains heat, cooling the belt sleeve under tension, and subsequently cutting the belt sleeve to provide individual V-belts.

5. A process of manufacturing virtually inextensible drive belts including the steps of vulcanizing a belt sleeve on a former, sealing the former within a sleeve member, immediately after the vulcanizing step forcing a pressure medium between the former and the vulcanized belt sleeve to stretch said vulcanized belt sleeve uniformly while the vulcanized belt sleeve retains some of the heat of the vulcanization process, cooling the vulcanized belt sleeve under pressure and cutting the vulcanized belt sleeve into individual endless belts.

4,710,252

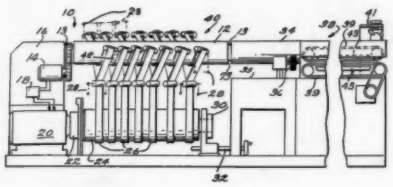
METHOD AND MACHINE FOR CONVOLUTE OR SPIRAL WINDING OF COMPOSITE MATERIALS

Leo Kadunce, Morrisville, Pa., assignor to Steeltin Can Corporation, Baltimore, Md.

Continuation of Ser. No. 663,211, Oct. 22, 1984, Pat. No. 4,629,529. This application May 8, 1986, Ser. No. 861,238

Int. Cl.[4] B05D *3/08*

U.S. Cl. 156—195 **15 Claims**



1. An apparatus for forming a cylindrical body from a substantially flat, flexible sheet material comprising:

mandrel means having a longitudinal axis and a peripheral surface,

means for feeding the sheet material to said mandrel means with the sheet material having a leading edge and a trailing edge and with the leading edge oriented in a selected manner relative to said longitudinal axis of said mandrel means,

endless belt means with said belt means having means for guiding said belt means along a selected path extending from a belt drive means to a selected portion of said mandrel means and for guiding said belt means along a substantially spiral path about and along a selected portion of the longitudinal axis of said mandrel means where said belt means is in contact with the surface of said mandrel means through a partial spiral wrap of greater than 300 degrees but less than 360 degrees about said mandrel means, said substantially spiral path of said belt means including a gap for receiving sheet materials from the feeding means so that a sheet material fed to said mandrel means at a selected angle with respect to said longitudinal axis of said mandrel means will be engaged by said belt means and formed into a cylindrical body on said mandrel means.

9. A method of forming a cylindrical body with an apparatus including a forming mandrel, an array of belts comprising the steps of

moving at least some of said belts each along a separate substantially spiral path about a portion of the mandrel where each said belt is in contact with the surface of the mandrel through a partial spiral wrap of greater than 300 degrees but less than 360 degrees about said mandrel with each spiral path including a gap,

feeding, sequentially, flat webs of material to the gap of a first belt,

wrapping each web about the circumference of the mandrel with an initial number of the belts until the web material takes on substantially a cylindrical shape,

maintaining the said cylindrical shape with a further at least one belt and conveying sequentially the formed webs to take off means.

4,710,253

METHOD FOR MANUFACTURING A CIRCUIT BOARD

Peter Soszek, Winnipeg, Canada, assignor to Somich Technology Inc., Winnipeg, Canada

Filed May 30, 1985, Ser. No. 739,192

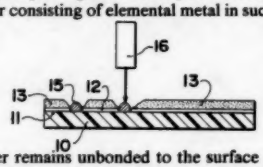
Claims priority, application United Kingdom, Jun. 4, 1984, 8414178

Int. Cl.[4] B32B *31/28*

U.S. Cl. 156—272.8 **15 Claims**

1. A method of producing a circuit board comprising an

electrically conductive pattern on an electrically non-conductive surface, the method comprising taking a circuit board substrate having an electrically non-conductive surface thereon, applying a layer of a heat actuable adhesive to said surface, loosely dispensing onto said layer an electrically conductive powder consisting of elemental metal in such a manner

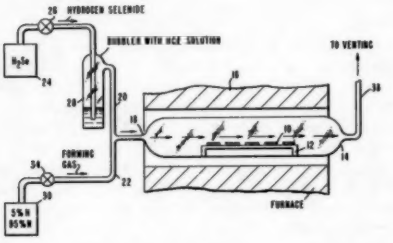


that the powder remains unbonded to the surface and can be readily removed therefrom, selectively heating said powder in said pattern to a temperature sufficient only to activate said adhesive without affecting the powder to adhesively bond said powder to said surface in said pattern, and removing from said surface powder which remains unbonded.

4,710,254
PROCESS FOR FABRICATING A SOLAR ENERGY CONVERTER EMPLOYING A FLUORESCENT WAVELENGTH SHIFTER

George F. J. Garlick, Los Angeles, Calif., assignor to Spectrolab, Inc., Sylmar, Calif.

Division of Ser. No. 651,864, Sep. 12, 1984, Pat. No. 4,584,428. This application Jan. 27, 1986, Ser. No. 822,450
Int. Cl.[4] B32B *31/12*
U.S. Cl. 156—278 7 Claims



1. A process for fabricating a solar converter which includes a gallium arsenide photovoltaic solar cell in combination with a zinc selenide fluorescent wavelength shifter comprising:

(a) providing a fluorescent zinc selenide substrate by passing chlorine-contaning zinc selenide vapor over a nonfluorescent zinc selenide substrate at a predetermined elevated temperature to introduce chlorine atoms into said substrate for a time sufficient to convert nonfluorescent zinc selenide to high quality, stable fluorescent zinc selenide;

(b) coating one surface of said zinc selenide substrate with a first anti-reflective coating;

(c) coating another surface of said zinc selenide substrate with a second anti-reflective coating;

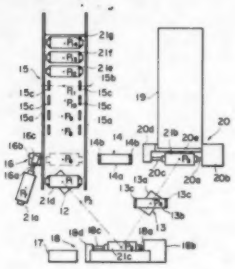
(d) providing a gallium arsenide solar cell having an anti-reflecting coating thereon; and

(e) adhesively bonding said second anti-reflective coating on said zinc selenide substrate to said anti-reflecting coating on said solar cell using a transparent bonding material, whereby said solar cell is protected from ultraviolet and proton radiation damage.

4,710,255
APPARATUS FOR MOLDING A BELT FOR TRANSMITTING POWER

Koichi Takeuchi, Sennan; Megumi Yamanaka, Osaka; Masayoshi Kubo, Nagasaki; Hideaki Katayama, Nagasaki, and Kenji Tokunaga, Nagasaki, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and Bando Chemical Industries, Inc., Hyogo, both of, Japan

Filed Jul. 29, 1985, Ser. No. 759,735
Int. Cl.[4] B65H *31/00*
U.S. Cl. 156—361 2 Claims



1. An apparatus for manufacturing a power transmitting belt comprising:

a rubber sheet mounting unit for mounting an unvulcanized rubber sheet on a mandrel;

a cord layer forming unit for forming a cord layer on the rubber sheet;

a ply servicer for winding an unvulcanized rubber sheet on the cord layer to form a laminated body;

a cutting means for cutting the laminated body to a predetermined shape;

a mandrels preserving means for preserving a plurality of mandrels;

a first transportation unit for moving the mandrel to the cord layer forming unit from the rubber sheet mounting unit;

a second transportation unit for moving the mandrel to the ply servicer from the cord layer forming unit;

a third transportation unit for moving the mandrel to said mandrels preserving means from the cutting means;

said winding process and said cutting process are carried out at the same position;

said mandrel is preserved in said mandrels preserving means;

said mandrels preserving means comprises a mandrel rack including rails, a running loader which runs on said rails and a mandrel supporter;

each of said plurality of mandrels has a mark for identifying the particular mandrel and the particular mandrel is selected by means of said mark from said plurality of mandrels;

said rubber sheet mounting unit includes a shaft for holding the selected mandrel, a bracket for fixing the shaft and a base for supporting the mandrel rotatably;

said cord layer forming unit comprises means for fixing the selected mandrel to a predetermined position, means for confirming whether the cord is identical with the designated cord and means for winding the cord in accordance with a predetermined program;

a cord feeding unit including a reel stand for rotatably holding the selected cord reel on which the desired padding cord is wound, tension means for giving the cord a predetermined tension and detection means for detecting a feeding amount of the cord to said cord layer forming unit,

said ply servicer includes a stand for receiving a stock roll on which the unvulcanized rubber sheet is wound together with cloth, drive means for feeding the rubber sheet from the stock roll to said mandrel wound with the padding

cord, a photoelectric switch for detecting a condition of festoon, a pulse generator for detecting the feeding quantity of the rubber sheet and cutting means for automatically cutting an extra rubber sheet after winding the rubber sheet on the selected mandrel;

said cutting means comprises means for fixing the selected mandrel to a predetermined position and means for cutting the laminated body in accordance with a predetermined program;

a main spindle, a headstock, a tail spindle, a tailstock and a cutter for cutting a cylindrical laminated body prepared in the former processes;

said first to third transportation units include rails, a truck which runs on the rails, a movable stand mounted on the truck slidably in the axis direction, a pair of mandrel supporters mounted on both ends of the movable stand movably in the vertical direction;

said rubber sheet mounting unit, said cord layer forming unit, said ply servicer, said cutting means and said first to third transportation units are controlled by a control unit comprising the means for inputting data necessary for molding the belt, detection means for detecting operation of each portion of units, drive means for driving each portion of units, means for outputting various information, and a central control unit CPU.

4,710,256

APPARATUS FOR ATTACHING FLAP-OVER COVERS TO STACKS OF PAPER SHEETS OR THE LIKE

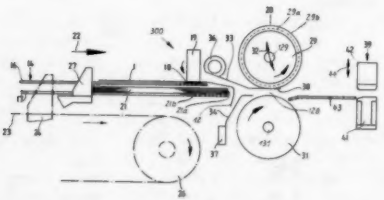
Dieter Ladewig, Jesteburg, and Bernd Ramcke, Hamburg, both of Fed. Rep. of Germany, assignors to E.C.H. Will (GmbH & Co.), Hamburg, Fed. Rep. of Germany

Division of Ser. No. 613,898, May 24, 1984, abandoned. This application Sep. 11, 1985, Ser. No. 774,933

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1983, 3320645

Int. Cl.[4] B42C *9/00, 1/00, 3/00, 11/02*

U.S. Cl. 156—484 **22 Claims**



1. Apparatus for applying flap-over cover sheets, each of which has an elongated downwardly extending adhesive-coated partially bent over marginal portion, to selected elongated edge faces of a series of stacks of paper sheets or the like, comprising a source of stacks; first transporting means for advancing said series of stacks from said source along a first path and in a first direction in such orientation that the selected edge faces of the stacks in said path extend transversely of said direction; a first support disposed at a first level and arranged to receive successive stacks from the first transporting means; a source of cover sheets; second transporting means for advancing successive cover sheets from the respective source along a second path and in a second direction in parallelism with the edge faces of stacks in said first path and longitudinally of the marginal portions of the respective cover sheets to positions in which the marginal portion of each successive cover sheet is adjacent to the selected edge face of the corresponding stack in said first path; a second support disposed at a second level above said first level and arranged to receive successive cover sheets from said second transporting means, the marginal portion of the cover sheet on said second support being adjacent to the selected edge face of the stack on said first support and such cover sheet being substantially parallel to the sheets of the stack on said first support; and pressure applying means for bonding the marginal portions of successive cover sheets to the edge faces of the respective stacks while the cover sheets remain substantially parallel to the sheets of the respective stacks.

4,710,257

DEVICE FOR THE APPLICATION OF AN ADHESIVE TO ONE OR MORE LOCALIZED AREAS OF A SHEET OF FLEXIBLE WRAPPING MATERIAL

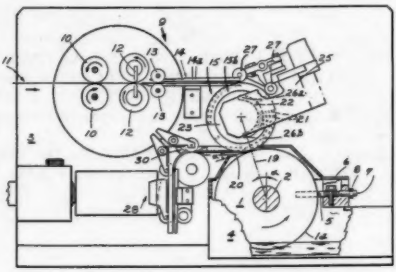
Riccardo Mattei, and Alessandro Minarelli, both of Bologna, Italy, assignors to G. D. Societa Per Azioni, Bologna, Italy

Filed Nov. 27, 1985, Ser. No. 802,461

Claims priority, application Italy, Nov. 29, 1984, 3637 A/84; Sep. 3, 1985, 3532 A/85

Int. Cl.[4] B65H *5/12*

U.S. Cl. 156—578 **10 Claims**



1. A device for the application of an adhesive to one or more localized areas of a sheet of flexible wrapping material, comprising a glue roller having either a one-piece or a sectional cladding which picks up adhesive from a tray or tank, and at least one scraper located in contact with the outer surface of the roller cladding, positioned upstream of the point where adhesive is applied to the sheet of wrapping material and performing a thorough cleaning action on the outer surface of the cladding such that adhesive remains only in localized areas, wherein a contact roller lying tangential to the glue roller at the point of application of the adhesive serves to transfer the sheet from an infeed point, located upstream of the point of application in relation to rotation of the contact roller, to a release point downstream of same at which sheets are taken up from the contact roller by a guide positioned adjacent thereto, and wherein the contact roller is provided with internal galleries that communicate with its cylindrical surface and connect by way of a chamber, located between the infeed point and the release point, with a means of generating suction, wherein the glue roller and the contact roller make contact with one another through a straight line generator lying in a plane that coincides with the axis of the glue roller and is raked in the direction of rotation thereof, so as to form an acute angle with a vertical axial plane passing through the self-same glue roller, and further wherein the guide takes up the sheet as it exits from the device itself, located in such a way as to ride the outer surface of the glue roller in close proximity to the point where the adhesive is transferred from the glue roller to the sheet of wrapping material, and positioned so as to afford uninterrupted support to the exiting sheet without any risk of its sticking fast or becoming diverted from its path.

4,710,258

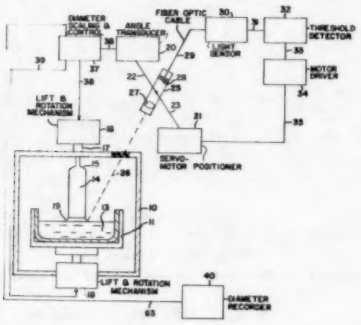
SYSTEM FOR CONTROLLING THE DIAMETER OF A CRYSTAL IN A CRYSTAL GROWING FURNACE

Henry C. Latka, Rochester, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Division of Ser. No. 676,694, Nov. 30, 1984, Pat. No. 4,617,173. This application May 19, 1986, Ser. No. 864,224

Int. Cl.[4] C30B *15/26, 15/30*

U.S. Cl. 156—601 **2 Claims**



1. The method of controlling the diameter of a crystal in a crystal growing furnace having lift and rotation control means for both the crystal and a crucible containing a melt comprising the steps of:

(a) sensing a spot of light on a meniscus at an interface between a growing crystal and the melt by transmitting said spot through an angularly operable light tube to an electrical transducing means,

(b) generating an electrical signal corresponding to the light intensity senses,

(c) generating an error signal in response to variations in the electrical signal,

(d) driving a servo motor shaft connected to the light tube to actuate the light tube angularly in response to the error signal,

(e) driving a shaft of an angular transducer by the shaft of the servo motor,

(f) generating a transducer error signal in response to rotation of the shaft of the transducer,

(g) governing the rate of lift and rotation by the transducer error signal,

(h) a further step of electronically limiting angular operation of the light tube by the servo motor to positions between inside and outside angular limits determined by a range of crystal diameters for which the method is used as sensed by electrical signals from the angular transducer and controlled by light levels through the light tube, and

(i) a further step of causing the light tube to scan an area of the melt between the inside and outside limits in case of a momentary power interruption to relocate the meniscus for continuation of the normal tracking operation.

4,710,259

SETTING THE ORIENTATION OF CRYSTALS

Stephen H. Howe, 4 Scariff Court, 39 Sycamore Grove, New Malden, Surrey, and Donald Rogers, 11 Salvington Crescent, Bexhill-on-Sea, East Sussex, both of United Kingdom

PCT No. PCT/GB84/00324, § 371 Date May 14, 1985, § 102(e) Date May 14, 1985, PCT Pub. No. WO85/01349, PCT Pub. Date Mar. 28, 1985

PCT Filed Sep. 24, 1984, Ser. No. 740,043

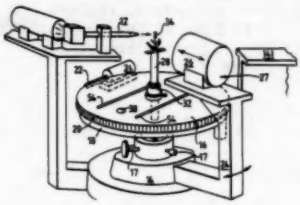
Int. Cl.[4] C30B *33/00, 15/20*

U.S. Cl. 156—601 **7 Claims**

1. A method of determining the orientation of one crystallographic axis in a plane of symmetry of a single crystal, having at least one plane of symmetry, relative to a predetermined set of orthogonal axes comprising:

directing onto the crystal, along one of said orthogonal axes, an X-ray beam comprising a peak of energy at a given wavelength,

detecting reflected X-ray energy by means of a two dimensional detector, and



adjusting the orientation of the crystal while relatively moving the crystal and the beam about an axis perpendicular to an equatorial plane containing the X-ray beam until any pair of reflexions that are symmetrical with respect to the equatorial plane occur simultaneously at the said wavelength of X-ray radiation.

4,710,260

DEPOSITION OF SILICON AT TEMPERATURES ABOVE ITS MELTING POINT

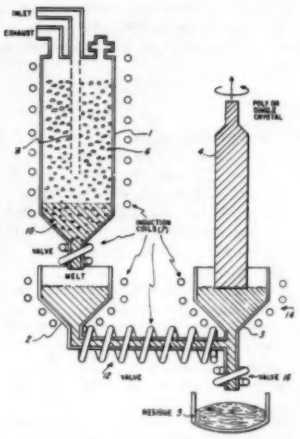
David E. Witter, Richardson, and Mohendra S. Bawa, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 452,173, Dec. 12, 1982, Pat. No. 4,547,258. This application Aug. 26, 1985, Ser. No. 769,632

The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.[4] C30B *15/04*

U.S. Cl. 156—605 **2 Claims**



1. A method for continuous production of silicon from a silicon bearing gas flow, comprising the steps of:

(a) providing a matrix of silicon nitride particles;

(b) forcing through a portion of said matrix of silicon nitride particles a stream of a silicon bearing gas mixture;

(c) said matrix of silicon nitride particles being heated to above 1300° C. but below the melting point of silicon while said gas flow is forced through said matrix; and

(d) periodically heating said matrix of nitride particles during said gas flow to above the melting point of silicon and collecting, at the bottom of said matrix of silicon nitride

particles, liquified silicon deposited on said nitride particles from said gas stream.

4,710,261

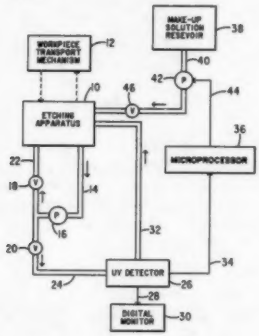
APPARATUS AND METHOD FOR MAINTAINING A UNIFORM ETCHING SOLUTION COMPOSITION

Timothy A. Dennis, Bloom Township, Wood County, Ohio, assignor to RCA Corporation, Princeton, N.J.

Filed Jan. 28, 1987, Ser. No. 7,858

Int. Cl.[4] H01L *21/306*

U.S. Cl. 156—626 **6 Claims**



1. A method of etching at a substantially uniform rate a metallization layer disposed on a substrate, comprising the steps of:

contacting said metallization layer with an etching solution comprising HNO_3 and H_3PO_4;

sampling at least a portion of said etching solution with a UV detector to produce an output signal which is a function of the HNO_3 concentration; and

delivering a make-up solution comprising HNO_3 and H_3PO_4 in controlled amounts responsive to said output signal to said etching solution, whereby a substantially uniform HNO_3 concentration is maintained within said etching solution.

4,710,262

PHOTOPOLYMERIZABLE COMPOSITION CONTAINING CARBOXY BENZOTRIAZOLE

Gregory C. Weed, Towanda, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 867,431, May 28, 1986, Pat. No. 4,680,249.

This application Feb. 24, 1987, Ser. No. 17,891

Int. Cl.[4] B44C *1/22;* **C23F** *1/02;* **B05D** *3/06, 5/12*

U.S. Cl. 156—630 **2 Claims**

1. In a process for laminating a photosensitive film to a substrate comprising the steps of

(a) laminating to the substrate a supported solid photosensitive film,

(b) imagewise exposing the layer to actinic radiation,

(c) removing unexposed areas of the layer to form resist areas,

(d) permanently modifying areas of the substrate which are unprotected by the resist areas by etching the substrate or by depositing a material onto the substrate, and

wherein the the photosensitive film contains

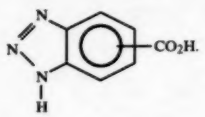
(a) addition polymerizable ethylenically unsaturated monomer,

(b) an initiating system activatable by actinic radiation

(c) an amphoteric polymer derived from interpolymerization of (1) at least one basic comonomer which is an acrylic or methacrylic acrylamide or methacrylamide, an aminoalkyl acrylate or methacrylate or mixture of any of these; (2) at least one acidic comonomer containing one or more carboxyl groups and (3) at least one further comonomer which is acrylic or methacrylic in character;

wherein the improvement comprises incorporation in the composition of

(d) a carboxy benzotriazole of the formula:



4,710,263

METHOD OF FABRICATING PRINT HEAD FOR THERMAL PRINTER

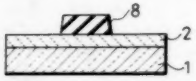
Masakazu Kato, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Sep. 5, 1986, Ser. No. 904,629

Claims priority, application Japan, Sep. 11, 1985, 60-200819

Int. Cl.[4] C23F *1/00, 1/02;* **B44C** *1/22;* **C03C** *15/00*

U.S. Cl. 156—637 **13 Claims**



1. A method of fabricating a print head for use in a thermal printer, comprising the steps of:

forming a thin metal film on the portion of a glaze layer that does not lie under the heater portion of the head;

then plating the thin metal film with a metal to form a metal layer;

forming a layer of a chemically stable and heat-resistant insulator on the portion of the metal layer that lies under the heater portion and also on the exposed portion of the glaze layer; and

thereafter removing the metal layer and the thin metal film, whereby the insulator layer on the glaze layer protrudes to the heater portion.

4,710,264

PROCESS FOR MANUFACTURING A SEMICONDUCTOR ARRANGEMENT

Eckehard Waschler, Neuhausen; Hermann Clauss, Leingarten, and Heinz-Achim Hefner, Brackenheim, all of Fed. Rep. of Germany, assignors to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany

Continuation of Ser. No. 735,322, May 17, 1985, abandoned.

This application Nov. 17, 1986, Ser. No. 931,879

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1984, 3421127

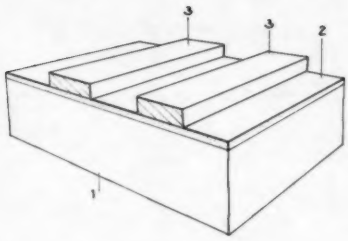
Int. Cl.[4] B44C *1/22;* **C03C** *15/00*

U.S. Cl. 437—228 **9 Claims**

1. A process for obtaining a planar-surface semiconductor consisting essentially of

forming an insulating layer on an uneven semiconductor surface, the insulating layer being planar and having a

depth substantially greater than the thickest portion of the uneven surface to build an extra depth; and



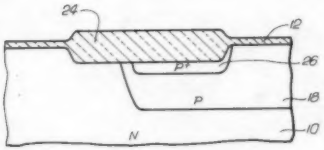
removing a portion of the insulating layer over the entire surface to obtain a thinner insulating layer having a substantially planar surface of a standard thickness.

4,710,265

METHOD OF PRODUCING SEMICONDUCTOR INTEGRATED CIRCUIT HAVING PARASITIC CHANNEL STOPPER REGION

Tadahiko Hotta, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Dec. 4, 1986, Ser. No. 938,010
Claims priority, application Japan, Nov. 30, 1985, 60-270325
Int. Cl.[4] H01L *21/22, 21/38;* **B44C** *1/22;* **C03C** *15/00*
U.S. Cl. 437—29 **6 Claims**



1. A method of producing a semiconductor integrated circuit, comprising the steps of:

preparing a semiconductor substrate of a first conductivity type and having a principal surface;

disposing a first mask material layer on said principal surface, said first mask material layer having a first impurity introducing region corresponding to a predetermined well forming pattern;

selectively doping a first impurity which determines a second conductivity type, opposite to said first conductivity type, into said principal surface through said first impurity introducing region, thereby forming a well region in said principal surface, said well region having said second conductivity type which is determined by said first impurity;

forming a second mask material layer in such a manner as to cover both said first impurity introducing region and said first mask material layer;

disposing first and second mask layers on said second mask material layer, said first and second mask layers respectively corresponding to a first active region pattern inside said well region and a second active region pattern outside said well region, thereby defining a second impurity introducing region corresponding to a predetermined parasitic channel stopper pattern between the stack portion of said first and second mask material layers and said first mask layer;

selectively ion-implanting a second impurity which determines said second conductivity type into the surface of said well region through said second impurity introducing region;

selectively removing said first and second mask material layers by selective etching using said first and second mask layers; and

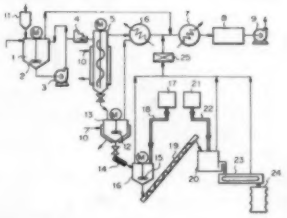
carrying out selective thermal oxidation using the remaining portions of said first and second mask material layers as a mask, whereby a field oxide film is formed on said principal surface, and a parasitic channel stopper region is formed within said well region and directly below said field oxide film, said parasitic channel stopper region having said second conductivity type which is determined by said second impurity.

4,710,266

APPARATUS FOR SUBJECTING A RADIOACTIVE SODIUM BORATE WASTE SOLUTION TO VOLUME REDUCTION AND SOLIDIFICATION

Tadamasa Hayashi, and Toyoshi Mizushima, both of Kanagawa, Japan, assignors to Ebara Corporation, Tokyo, Japan

Continuation of Ser. No. 639,114, Aug. 9, 1984, abandoned. This application Mar. 20, 1986, Ser. No. 841,036
Claims priority, application Japan, Aug. 9, 1983, 58-144452
Int. Cl.[4] B01D *1/22;* **G21F** *9/08, 9/16*
U.S. Cl. 159—7 **4 Claims**



1. An apparatus for producing a vitric solid solution comprising (a) the solid content of a radioactive waste solution of sodium borate discharged from a pressurized water reactor, having a Na_2O to B_2O_3 molar ratio of 0.1 to 0.06 and (b) 10 to 40 mole % of ZnO or 10 to 40 mole % of ZnO plus 3 to 10 mole % of Al_2O_3 and/or CaO so that the total content of ZnO plus Al_2O_3 and/or CaO does not exceed 43 mole %,

the apparatus comprising:

(A) a waste solution feed tank equipped with a hopper for stabilizing agent in water, a stirrer for stirring the sodium borate waste solution and the stabilizing agent in water added thereto from said hopper;

(B) a waste solution circulation pump for circulating a part of the resulting mixture to the waste solution feed tank and another part of the resulting mixture to an evaporator through a waste solution supply pump;

(C) the evaporator for evaporating and concentrating the waste solution fed from the pump to remove water by a heating fluid so as to form an evaporator residue;

(D) a heating type dehydrator for heating the evaporator residue sent from the evaporator by a heating fluid while being stirred by a stirrer, for further evaporation;

(E) a powder dryer for removing the crystal water of the evaporation residue, thereby rendering said residue as a porous lump, by heating with a microwave generator through a microwave guide tube, and a stirrer for grinding the lump into a powder provided therein;

(F) discharger means for forcible batch delivery of said residue to said powder dryer;

(G) a melting furnace for melting into a vitric melt the dried power sent from the powder dryer by irradiation with microwaves transmitted from a microwave generator through a microwave guide tube, said melt being charged in a solid solution container;

(H) a condenser for condensing the evaporated water generated from the evaporator and the heating type dehydrator;

(I) a prefilter for filtering the off-gas from the powder dryer and the melting furnace to remove solids;
(J) an off-gas cooler for removing the residual water of the off-gas from the waste solution feed tank, the condenser and the prefilter;
(K) an off-gas treater for purifying the off-gas from the off-gas cooler to discharge it from an off-gas exhaust fan.

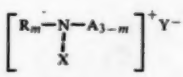
4,710,267

PROCESS FOR REDUCING DISCOLORATION AND/OR TACKINESS IN PROCESSING WASTE PAPER FIBERS

Leif Elsby, and Agneta Carlsson, both of Stenungsund, Sweden, assignors to Berol Kemi AB, Stenungsund, Sweden

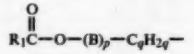
Filed Mar. 19, 1985, Ser. No. 713,516
Claims priority, application Sweden, Mar. 19, 1984, 8401498
Int. Cl.[4] D21C *5/02*
U.S. Cl. 162—5 **8 Claims**

1. A process for reducing discoloration and tackiness in the processing of waste paper fibers which contain tacky impurities for the preparation of recycle paper fiber products, which comprises adding during processing the waste paper fibers which contain tacky impurities as an aqueous pulp suspension an amount effective to reduce discoloration and tackiness of a surface-active tertiary amine or tertiary or quaternary ammonium compound having the formula:



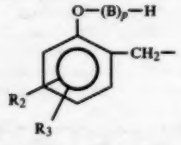
I

in which:
the groups X and Y are present only when N is tetravalent;
A is selected from the group consisting of
(i) alkyl having from one to about four carbon atoms; and
(ii) B_pH where B is an alkyleneoxy group derived from an alkylene oxide having from two to four carbon atoms or mixtures thereof, at least 50% of the alkyleneoxy groups being the ethyleneoxy groups;
p is an average number representing the number of alkyleneoxy groups within the range from 1 to 30; m is a number from 1 to 3;
X is selected from the group consisting of hydrogen, alkyl having from 1 to 2 carbon atoms, and hydroxyalkyl having from two to four carbon atoms;
Y is an anion;
R is selected from the group consisting of:



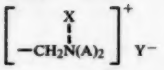
(Ia)

where:
R_1 is hydrocarbon having from about nine to about twenty-three carbon atoms;
q is a number from 2 to 4;
B and p are as above;

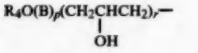


(Ib)

where:
B and p are as above;
R_2 and R_3 are selected from the group consisting of hydrogen and alkyl having from one to about eighteen carbon atoms; and groups having the formula:



where:
X and Y are present only when the nitrogen is tetravalent; and
A, X and Y are as above;



(Ic)

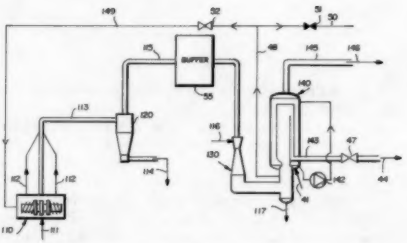
where:
R_4 is hydrocarbon having from about ten to about thirty-five carbon atoms;
r is a number from 1 to 3; and
B and p are as above.

4,710,268

METHOD FOR REGULATING THE PRESSURE OF BLOW-THROUGH DISCHARGE STEAM FROM A REBOILER OF PROCESS STEAM PRODUCED DURING PRODUCTION OF MECHANICAL PULP

Bengt H. Nilsson, Skoghall, Sweden, assignor to Kamyr AB, Karlstad, Sweden

Filed Jun. 20, 1986, Ser. No. 876,935
Claims priority, application Sweden, Jun. 24, 1985, 85031177
Int. Cl.[4] B21B *1//12*
U.S. Cl. 162—23 **10 Claims**

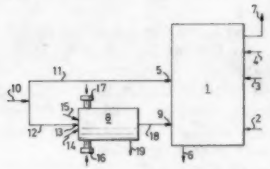


1. A method of producing steam during the refining of finely comminuted cellulosic fibrous material to produce mechanical pulp, comprising the steps of:
(a) refining the finely comminuted cellulosic fibrous material to produce a mixture of mechanical pulp and superatmospheric pressure process steam which is inherently produced during the refining action;
(b) separating the process steam from the mechanical pulp;
(c) reboiling the process steam in a reboiler to produce clean steam and discharged blow-through process steam; and
(d) regulating the pressure of the discharged blow-through steam from the reboiler so as to maximize the energy content of the clean steam produced in step (c), the boiler having a blow-through process steam outlet through which the blow-through steam is discharged, the blow-through steam being kept separate from the clean steam, and wherein step (d) is practiced by providing a regulating valve in the blow-through process steam outlet from the reboiler, and providing no significant pressure change of the process steam from step (b) to step (c).

4,710,269
RECOVERING CHEMICALS FROM SPENT PULP LIQUORS

Sven Santén, Hofors; Sven Eriksson, and Ragnar Bernhard, both of Falun, all of Sweden, assignors to SKF Steel Engineering AB, Hofors, Sweden

Filed Jan. 27, 1986, Ser. No. 822,564
Claims priority, application Sweden, Mar. 26, 1985, 8501465
Int. Cl.[4] D21C *11/12*
U.S. Cl. 162—30.1 **7 Claims**



1. A method of increasing the capacity and improving the chemical recovery of a soda recovery boiler, comprising the steps of:

supplying spent sulphate liquor to a liquor gasifier;

supplying external energy in the form of a gas rich in energy which has been heated in a plasma generator, independent of combustion to the liquor gasifier, controlling separately the temperature and oxygen potential of the liquor gasifier;

producing a chemical melt product comprising a sodium compound in the liquor gasifier;

producing a gas product comprising Na, Co and H_2 in the liquor gasifier;

introducing the gas product of the liquor gasifier into a soda recovery boiler; and

withdrawing from the soda recovery boiler the organic constituents of the liquor gasifier gas product primarily as a gas.

4,710,270
PAPER MAKING PROCESS UTILIZING FILLERS WITH HARDENED ENVELOPES OF CATIONIC STARCH

Olof Sundén, 1, Rue Hotel Dieu, F74200 Thonon, France, and Agneta Sundén, 22, Av. General Guisan, 1180 Rolle, Switzerland

Continuation-in-part of Ser. No. 373,487, Apr. 22, 1982, abandoned. This application Aug. 29, 1984, Ser. No. 645,527
Claims priority, application European Pat. Off., Sep. 19, 1980, 8006599-8; Sep. 19, 1980, 8006600-4; PCT Int'l Appl., Sep. 16, 1981, WO81/00147
Int. Cl.[4] D21H *3/20*
U.S. Cl. 162—175 **6 Claims**

1. In a method for forming paper from an aqueous slurry of cellulosic fibers and a separate slurry of mineral fillers mixed with and enveloped by a dispersion of cationic starch (CS) and carboxymethyl cellulose (CMC) or alginate, the improvement comprising the steps of:

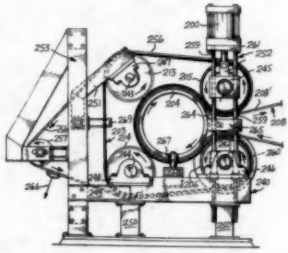
(a) swelling 100 parts by weight CS particles in an aqueous solution of 1–8 parts, by weight, of carboxymethyl cellulose or alginate at temperature-time conditions selected to prevent molecular solubilization of the CS to form an aqueous dispersion of viscous CS droplets that is at least 2% CS by weight, said dispersion of CS droplets being superficially reacted with CMC or alginate, and adding this dispersion to said slurry of mineral fillers prior to attainment of coacervate equilibrium by said dispersion, thereby individually enveloping the filler particles;

(b) adding to said slurry of enveloped mineral fillers, while still in a transitional non-equilibrium state, a synerese hardening compound comprising a solution of a polyaluminum complex having a composition within the stoichiometric formula limits $Al_{12}(OH)_{21-30}Ci_{6-12}(SO_4)_{0-4}$, where Ci represents a citric acid equivalent, in an amount of at least 1% by weight of the CS measured as Al_2O_3, whereby a synerese hardening reaction is effected and the enveloped mineral fillers become less hydrated and form a strong gel.

4,710,271
BELT AND DRUM-TYPE PRESS

Ray R. Miller, 8816 Warren Dr., NW., Gig Harbor, Wash. 98335, assignor to Ray R. Miller, Gig Harbor and Weyerhaeuser Co., Tacoma, both of, Wash., a part interest

Filed Apr. 8, 1986, Ser. No. 849,931
Int. Cl.[4] D21F *3/00, 5/02*; F26B *13/18*
U.S. Cl. 162—360.1 **21 Claims**



1. A drum and belt-type press for compressing a moving web or mat which comprises:

(a) a supporting frame for a drum, belt tensioning rolls, and belt tensioning means;

(b) a pair of spaced apart first and second cylindrical belt tensioning rolls having essentially parallel axes of rotation;

(c) a central drum adjacent said tensioning rolls, said drum having an axis of rotation essentially parallel to the axis of rotation of the rolls;

(d) an endless flexible belt having an inner generally U-shaped course and an outer generally U-shaped course, the inner and outer courses meeting in loops which wrap around the tensioning rolls,

the tensioning rolls each being contained within the body of the belt and the drum being outside the body of the belt, the inner course of the belt being wrapped around more than half the circumference of the central drum,

the tensioning rolls and drum being sized so that the inner and outer courses of the belt are spaced apart,

each tensioning roll and any other rolls within the belt making nip contact with the drum through the interposed belt so that the total compressive forces of the belt and nips on the central drum are balanced and the summation of forces about the drum axis is essentially zero;

(e) drive means for moving the belt through its endless path, so that a web or mat may be compressed by interposing it between the moving belt and drum,

(f) tensioning means acting on the tensioning rolls to translate them relatively toward or away from each other to control belt tension while maintaining nip contact, and

(g) the tensioning rolls being mounted on the supporting frame the drum being free floating with respect to the tensioning rolls for relative radial movement in response to tensioning adjustments, and the press is structured to maintain nip contacts without transmitting significant belt tensioning forces to the supporting frame or significant axial bending forces to the drum.

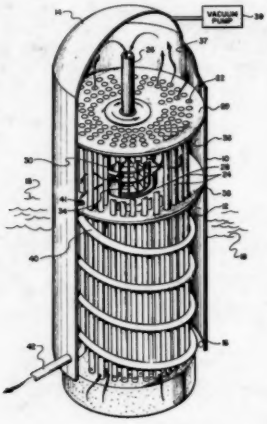
4,710,272
DISTILLING APPARATUS

Frank J. Passarelli, 1728 Kelton Ave., Los Angeles, Calif. 90024; George A. Matsukas, 1834 W. Hiway 154, Santa Ynez, Calif. 93460, and Charles P. Caspary, 21524 Nordhoff St., Chatsworth, Calif. 91311

Continuation-in-part of Ser. No. 700,976, Feb. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 476,582, Mar. 18, 1983, abandoned. This application Mar. 20, 1986, Ser. No. 841,803

Int. Cl.[4] B01D *3/04, 3/10*

U.S. Cl. 202—205 **4 Claims**



1. In combination with a means defining a source of non-consumable water, a distilling apparatus connecting with said means, said distilling apparatus comprising:

a tubular container having a longitudinal center axis, said longitudinal center axis being substantially vertical, said tubular container having a top and a bottom, said top being closed, said bottom being open, said bottom being submerged beneath the surface of the source, said container defining an upper section and a lower section;

means for drawing vacuum within said upper section, a reservoir formed within said lower section, wherein a portion of said source flows into said reservoir comprising a free standing vertical column within said reservoir, said portion of said source having a surface exposed to vacuum, whereby vapor is released from said surface;

a vapor collecting chamber and a product liquid collecting chamber located within said upper section, said product liquid collecting chamber being located between said vapor collecting chamber and said reservoir;

a first conduit means passing through the product liquid collecting chamber with the upper open end connected with said vapor collecting chamber and the lower open end connected with said reservoir, said first conduit means for moving the vapor into said vapor collecting chamber heat produced during condensation of the vapor within said product liquid collecting chamber being conducted into said first conduit means;

compressor means mounted within said product liquid collecting chamber, said compressor means having an inlet connected to a second conduit means and an outlet connect with said product liquid collecting chamber, said second conduit means having an inlet connected to the vapor collecting chamber and an outlet connected to the compressor, said compressor means for extracting the vapor from said vapor collecting chamber and compressing ssaid vapor facilitating condensation of the vapor into product liquid; and

discharge means connected to said product liquid collecting chamber for conducting said product liquid exteriorly of said product liquid collecting chamber, whereby said product liquid is removed from said product liquid collecting chamber and additional non-consumable water of said source automatically flows into said reservoir maintaining said source at said free standing vertical column.

4,710,273
OLEFIN PURIFICATION PROCESS

Ted T. Okamoto, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Aug. 8, 1985, Ser. No. 763,525

Int. Cl.[4] B01D *3/34;* **C07C** *7/148*

U.S. Cl. 203—29 **12 Claims**

1. A process for removing vinyldene olefins from a mixture of C_6–C_{30} olefins containing about 5–40 mole percent vinylidene olefins, 0–20 mole percent interval olefins and the balance vinyl olefins said process comprising:

(A) reacting said mixture of olefins with a sulfur halide in the presence of a Lewis Acid catalyst to selectively couple said vinylidene olefins through a sulfide or polysulfide bridge to form an intermediate mixture containing halo-substituted sulfide-bridged compounds,

(B) reacting said intermediate mixture with an aqueous alkali metal hydrosulfide solution to form a second intermediate mixture and

(C) distilling said vinyl olefins and internal olefins from said second intermediate mixture to obtain as the distillate an olefin mixture containing substantially less vinylidene olefins than were in said mixture of C_6–C_{30} olefins and leaving a residual product useful as an extreme pressure additive for lubricating oil.

4,710,274
SEPARATION OF ETHANOL FROM ISOPROPANOL BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. 3rd Ave., Bozeman, Mont. 59715, and Mark G. Vosburgh, 4670 - 23rd Ave., Missoula, Mont. 59803

Continuation-in-part of Ser. No. 757,318, Jul. 19, 1985, abandoned. This application Aug. 4, 1986, Ser. No. 892,288

Int. Cl.[4] B01D *3/40;* **C07C** *29/84*

U.S. Cl. 203—51 **5 Claims**

1. A method for recovering ethanol from a mixture of ethanol and isopropanol which comprises distilling a mixture of ethanol and isopropanol in a rectification column in the presence of about one to two parts of extractive agent per part of ethanol—isopropanol mixture, recovering ethanol as overhead product and obtaining the extractive agent and isopropanol from the stillpot, the extractive agent comprises a benzoate containing from eight to nine carbon atoms.

4,710,275
SEPARATION OF ISOPROPANOL FROM T-BUTANOL BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., and Mark G. Vosburgh, 522 W. Main St., both of Bozeman, Mont. 59715

Filed Sep. 20, 1985, Ser. No. 778,403

The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.

Int. Cl.[4] B01D *3/40;* **C07C** *29/84*

U.S. Cl. 203—51 **4 Claims**

1. A method for recovering isopropanol from a mixture of isopropanol and t-butanol which comprises distilling a mixture of isopropanol and t-butanol in a rectification column in the presence of about one to two parts of extractive agent per part of isopropanol - t-butanol mixture, recovering essentially pure isopropanol as overhead product, obtaining the t-butanol and the extractive agent from the stillpot or reboiler, separating the t-butanol from the extractive agent by conventional distillation in another rectification column, wherein said extractive agent

(1) is an organic compound or a mixture of organic com-

pounds composed solely of carbon, hydrogen and oxygen and containing a six carbon atom aromatic ring
(2) boils at least 100 Centigrade degrees above t-butanol
(3) does not form binary azeotropes with either isopropanol or t-butanol
(4) does not form a ternary azeotrope with isopropanol and t-butanol
(5) is soluble in boiling isopropanol - t-butanol mixtures
(6) in combinatioh with isopropanol and t-butanol, results in a relative volatility of isopropanol to t-butanol greater than 1.10.

4,710,276
PROCESS FOR THE GALVANOPLASTIC PRODUCTION OF JEWELRY

Herbert Kull, Nuremberg, Fed. Rep. of Germany, assignor to Juwedor GmbH, Fed. Rep. of Germany

Filed Dec. 12, 1986, Ser. No. 940,859
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1985, 3544429
Int. Cl.[4] C25O *1/02*
U.S. Cl. 204—9 **14 Claims**

1. A process for the galvanoplastic production of substantially hollow jewelry made from metal with at least one mount for a stone, wherein the metal is electrolytically deposited on an electrically conductive mould core to form a metal coating having the spatial contour of a piece of jewelry having a mount, wherein after reaching the desired coating thickness the core material is dissolved and removed through an opening in the metal coating, wherein the mould core is provided in the vicinity of the mount with a mould surface forming in the metal coating a gem support and projections surrounding the same, and wherein after removing the core material a gem is placed on the gem support and the projections are pressed onto the gem to hold it in place on the support.

4,710,277
METHOD FOR MANUFACTURING ZINC HYDROMETALLURGICALLY

Fröystein Dyvik, Odda, and Thomas K. Miöen, Stockholm, both of Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden

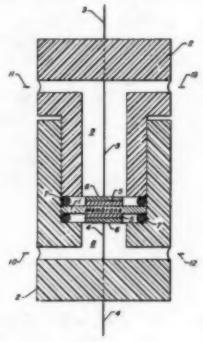
Filed Dec. 2, 1986, Ser. No. 937,074
Claims priority, application Sweden, Dec. 20, 1985, 8506050
Int. Cl.[4] C25C *1/14*
U.S. Cl. 204—119 **15 Claims**

1. A method for manufacturing zinc hydrometallurgically from a zinc-containing starting material that has been treated with at least one leaching stage to form a solution, at least one solution purifying stage and at least one electrowinning stage from which recovered liquid is recycled to at least one of said leaching stages, said method comprising:
(a) withdrawing a predetermined portion of the solution from after at least one of said electrowinning stages, said portion containing dissolved zinc, magnesium and manganese;
(b) concentrating the portion by evaporation to precipitate magnesium and manganese in the form of metal salt crystals; and
(c) separating the metal salt crystals from the portion so as to form a residual liquid phase, said predetermined portion being selected so that accumulation of magnesium and manganese in the solution is avoided.

4,710,278
METHOD AND APPARATUS FOR SEPARATION AND PURIFICATION OF HYDROGENOUS COMPOUNDS WITH NOVEL MEMBRANE

Anthony J. Polak, Lake Zurich, and Allyson J. Beuhler, Indian Head Park, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 566,841, Dec. 29, 1983, abandoned. This application Apr. 21, 1986, Ser. No. 854,285
The portion of the term of this patent subsequent to Feb. 19, 2002, has been disclaimed.
Int. Cl.[4] C25B *1/02, 9/00*
U.S. Cl. 204—129 **18 Claims**



1. Apparatus for separation of hydrogen from a gaseous mixture having a component which is capable, in the presence of a catalytic agent, of dissociating to yield hydrogen ions comprising:
(a) a thin film membrane which comprises a single phase solution blend of (i) from about 10% to about 70% by weight of a compound selected from the group consisting of heteropoly acids and salts thereof, where said heteropoly acids have the generic formula:

$$A_m[X_xY_yO_z].n\ H_2O$$

in which X is selected from the group consisting of boron, aluminum, gallium, silicon, germanium, tin, phosphorus, arsenic, antimony, bismuth, selenium, tellurium, iodine, and metals of the first, second, third, fourth, fifth and sixth transitional metal series of the periodic table, said series including scandium, yttrium, lanthanum, actinium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten, where Y is dissimilar from X and is selected from the group consisting of the metals of the first, second, third and fourth transitional metal series of the periodic table, A is selected from the group consisting of hydrogen, ammonium, sodium, potassium, lithium, rubidium, cesium, beryllium, magnesium, calcium, strontium and barium, m is an integer of from 1 to 10, y is an integer of from 6 to 12 based on x taken as 1, z is an integer of from 30 to 80, and n is an integer of from 3 to 100, and (ii) from about 90% to about 30% by weight of a polymer compatible with said compound which is selected from the group consisting of poly(vinyl alcohol), poly(vinyl fluoride), polyethylene oxide, polyethyleneimine, polyacrylic acid, polyethylene glycol, cellulose acetate, polyvinylmethylethyl ether, and phenol formaldehyde resins;

(b) a membrane housing comprising a first gas chamber and a second gas chamber separated by a substantially impor-ous partition comprising said membrane, said membrane having a first surface in common with the first gas chamber and a second surface in common with the second gas chamber;

(c) two separate portions of catalytic agent effective to promote dissociation and combination, one portion in contact with said first surface and one portion in contact with said second surface of said membrane;

(d) means for forming electrical connection in operative contact with said catalytic agent at said first surface and with said catalytic agent at said second surface; and

(e) means to supply a gaseous mixture containing hydrogen to said first gas chamber.

14. Method for separation of hydrogen from a gaseous mixture having a component which is capable, in the presence of a catalytic agent, of dissociating to yield hydrogen ions, such method comprising contacting said gaseous mixture with a first surface of a thin film solution blend membrane and forming an electrical connection between two separate portions of catalytic agent effective to promote dissociation and combination, where one portion of catalytic agent is in contact with said first surface and one portion of catalytic agent is in contact with a second opposing surface of said membrane, which membrane isolates said gaseous mixture from a pure gas comprising hydrogen separated from the gaseous mixture, and which membrane has said second surface exposed to the pure gas while recovering hydrogen formed at said second surface, said membrane comprising a single phase solution blend of (i) from about 10to about 70% by weight of a compound selected from the group consisting of heteropoly acids and salts thereof, where said heteropoly acids have the generic formula:

$$A_m[X_xY_yO_z].\ nH_2O$$

in which X is selected from the group consisting of boron, aluminum, gallium, silicon, germanium, tin, phosphorus, arsenic, antimony, bismuth, selenium, tellurium, iodine, and metals of the first, second, third, fourth, fifth and sixth transitional metal series of the periodic table, said series including scandium, yttrium, lanthanum, actinium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten, where Y is dissimilar from X and is selected from the group consisting of the metals of the first, second, third, and fourth transitional metal series of the periodic table, A is selected from the group consisting of hydrogen, ammonium, sodium, potassium, lithium, rubidium, cesium, beryllium, magnesium, calcium, strontium and barium, m is an integer of from 1 to 10, y is an integer of from 6 to 12 based on x taken as 1, z is an integer of from 30 to 80, and n is an integer of from 3 to 100, and (ii) from about 90% to about 30% by weight of a polymer compatible with said compound which is selected from the group consisting of poly(vinyl alcohol), poly(vinyl fluoride), polyethylene oxide, polyethyleneimine, polyacrycylic acid, polyethylene glycol, cellulose acetate, polyvinylmethylethyl ethe:, and phenol formaldehyde resins.

4,710,279

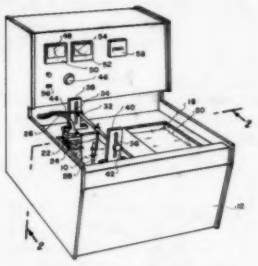
METHOD AND BATH FOR ELECTRO-CHEMICALLY RESHARPENING OF CUTTING TOOLS

Norman R. Hozer, 2085 Brookfield Dr., Thousand Oaks, Calif. 91362

Filed Mar. 2, 1987, Ser. No. 20,510
Int. Cl.[4] C25F *3/00*
U.S. Cl. 204—129.55 **5 Claims**

1. A bath for electro-chemically resharpening of metallic cutting tools comprising:

an aqueous solution of phosphoric acid (approximately sixty-nine percent by volume) and sulphuric acid (approximately twenty-five percent by volume) to which is added stabilizers of chromic acid (approximately two grams per liter), nickel carbonate (approximately five grams per



liter) and ferric oxide (approximately two-tenths gram per liter).

4,710,280

METHOD AND APPARATUS FOR ELECTROCHEMICALLY CLEANING GUN BORES AND THE LIKE

George H. Brilmyer, 1009 Sherman Rd., Cedarburg, Wis. 53012, and Dennis L. Marshall, 2006 N. 107th St., Wauwatosa, Wis. 53226

Filed May 5, 1986, Ser. No. 859,437
Int. Cl.[4] C25F *5/00, 7/00*
U.S. Cl. 204—146 **21 Claims**

1. The method for selective removal of nonferrous metal deposits selected from the group consisting of copper, lead and alloys of each from ferrous base metals compirsing the steps of:

a. selecting an electrolytic solution which promotes solubilization of the nonferrous metal deposit and does not promote oxidation of the ferrous base metal;

b. selecting electrode means for supporting an electrical current to oxidize the nonferrous metal;

c. applying a controlled direct current potential between the ferrous base metal and the electrode means in the electrolytic solution such that the ferrous base metal is maintained sufficiently positive with respect to the electrode means to oxidize the nonferrous metal without actively oxidizing the ferrous base metal; and,

d. maintaining the potential for a time sufficient to remove the nonferrous metal.

4,710,281

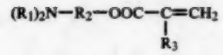
PROCESS FOR COATING AN ELECTRICALLY CONDUCTIVE SUBSTRATE AND AN AQUEOUS COATING COMPOSITION BASED ON A CATIONIC BINDER

Chantal H. Guioth, Rantigny; Etienne G. Maze, Breuil le Vert, and Loïck P. Rabajoie, Chantilly, all of France, assignors to Akzo NV, Arnhem, Netherlands

Filed Jul. 7, 1986, Ser. No. 882,379
Claims priority, application Netherlands, Jul. 5, 1985, 8501939
Int. Cl.[4] C25D *13/06*
U.S. Cl. 204—181.7 **16 Claims**

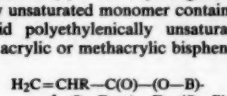
1. A process for coating a substrate, comprising applying to said substrate an aqueous coating composition based on a cationic binder obtained by polymerization of a monomer mixture in the presence of 0.25–4 parts by weight of a polyethylenically unsaturated compound per 100 parts by weight of the monomer mixture,

said monomer mixture consisting of (a) 1–30% by weight of a hydroxy(cyclo)alkyl (meth)acrylate of which the (cyclo)alkyl group contains 2–8 carbon atoms, (b) 4–45% by weight of an amino (meth)acrylate of the formula



where at least one of the groups R_1 is a hydrocarbon group containing 1–12 carbon atoms and the other group R_1 is a hydrocarbon group containing 1–12 carbon atoms or a hydrogen atom, or the two groups R_1, together with the nitrogen atom attached thereto, form a heterocyclic group, R_2 is a hydrocarbon group containing 2–12 carbon atoms and R_3 is a hydrogen atom or a methyl group, (c) 0–80% by weight of a monovinyl aromatic hydrocarbon containing 8–14 carbon atoms, and (d) 0–50% by weight of a different monoethylenically unsaturated monomer containing 2–20 carbon atoms;

said polyethylenically unsaturated compound being an acrylic or methacrylic bisphenol ester of the formula



wherein R represents a hydrogen atom or a methyl group, A represents a hydrocarbon group containing 1–4 carbon atoms, B represents a hydrocarbon group containing 2–3 carbon atoms, or a 2-hydroxypropylene group D represents a phenylene group or a cyclohexylene group, m is a number from 1–4 and n is a number from 1–3;

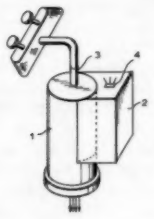
amino groups present in said binder being at least partially neutralized with an acid.

4,710,282

DEVICE FOR SILIVERIZING RUNNING WATER

Maryan Chak, 483 Ocean Pkwy., Brooklyn, N.Y. 11218, and Moisey Dobruskin, 2901 Ocean Pkwy., Brooklyn, N.Y. 11235

Filed Aug. 8, 1986, Ser. No. 894,900
Int. Cl.[4] C25B *9/00, 11/03, 11/04*
U.S. Cl. 204—228 **22 Claims**



1. A device for silverizing water, comprising passage forming means having an inlet, an outlet and a passage extending between said inlet and said outlet so that said inlet and said outlet are open during silverizing of water and water can run from said inlet to said outlet through said passage; and at least one pair of electrodes including a silver-containing anode and a cathode formed and located relative to one another and relative to said inlet and said outlet so that water running from said inlet to said outlet through said passage is guided by said electrodes to repeatedly change its direction so as to flow transversely to and along said electrodes to continuously saturate the water running from said inlet to said outlet with ions of silver emerging from said anode, said electrodes being formed as plates each having a central region and a peripheral region, one of said electrodes being provided with a central through channel, whereas the other of said electrodes is provided with a peripheral channel for passing the running water through said channels.

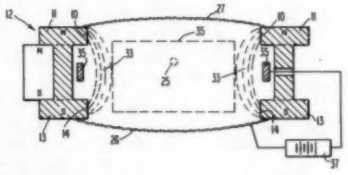
6. A device as defined in claim **1**; and further comprising current supply means arranged to supply current to said electrodes; and current adjusting means actuatable by a user so as to adjust current supplied by said current supply means to at least two different current values alternatingly and thereby to adjust the quantity of silver ions discharged into the running water to at least two silverizing values alternatingly so as to obtain at said outlet either a higher silverized water or a lower silverized water.

4,710,283

COLD CATHODE ION BEAM SOURCE

Bawa Singh, and Peter R. Denton, both of Cherry Hill, N.J., assignors to Denton Vacuum Inc., Cherry Hill, N.J.

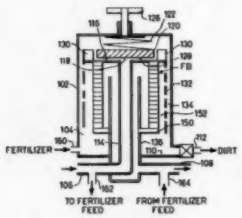
Filed Jan. 30, 1984, Ser. No. 574,882
Int. Cl.[4] C23C *14/36;* **H01J** *27/02*
U.S. Cl. 204—298 **3 Claims**



1. A cold cathode ion beam source comprising in combination: first and second magnetic flux conducting means with each formed into an endless configuration having a relatively large aperture therethrough, first separation means formed of material which does not conduct magnetic flux and formed into an endless configuration having an aperture therethrough which aperture is larger than said relatively large aperture, said first separation means disposed to separate said first and second magnetic flux conducting means and provide a common aperture, with first and second ends, passing through said first magnetic flux conducting means, through said first separation means, and through said second magnetic flux conducting means said common aperture having an inside surface formed to be concave with said first and second magnetic flux conducting means providing first and second ends of said concave configuration; magnetic flux source means disposed in close proximity to said first and second magnetic flux conducting means to provide flux passing from said first end to said second end of said concave formed inside surface thereby creating a first enclosure between said last mentioned magnetic flux and said concave formed inside surface; third and fourth magnetic flux conducting means separated by second separation means, said second separation means formed of material which does not conduct magnetic flux and disposed with respect to said third and fourth magnetic flux conducting means to form a second concave surface made up by part of said third magnetic flux conducting means, by said second separation means, and by part of said fourth magnetic flux conducting means, said third and fourth magnetic flux conducting means formed to fit within said common aperture and disposed to provide a gap between the combination of said first and second magnetic flux source means and the combination of said third and fourth magnetic flux conducting means, second magnetic flux source means disposed in close proximity to said third and fourth magnetic flux conducting means to provide flux to pass therethrough, said second concave surface designed to be a mirror image of said concave formed inside surface whereby magnetic flux provided by said second magnetic flux source means passes from a first end to a second end of said second concave surface thereby creating a second enclosure, and said second enclosure being between said last mentioned magnetic flux and said second concave surface; first and second anode means respectively disposed within said first and second enclosures; cathode means disposed along said gap; electrical power means connected to said cathode and said anodes to cause an electrostatic field therebetween whereby a region of plasma can be formed in said gap; ionizable fluid disposed in said gap so that

when electrical energy is applied to said cathode and to said anodes a plasma forms along said gap.

4,710,284
CYCLONIC SEPARATOR
Meir Amit, Nethanya, Israel, assignor to Amiad, Korazim, Israel
Filed Oct. 25, 1985, Ser. No. 791,610
Claims priority, application Israel, Oct. 26, 1984, 73329
Int. Cl.[4] B03B *5/66*
U.S. Cl. 209—17 **17 Claims**

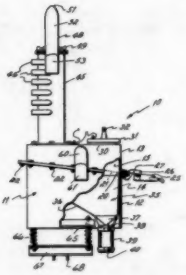


1. A cyclonic separator for separating solid particles from a fluid, comprising:
a housing including a chamber, a fluid inlet into said chamber, a fluid outlet from said chamber, and a radially-extending passageway between said inlet and said chamber;
first deflector means between said inlet and said chamber for deflecting the fluid flowing from said inlet to said radially-extending passageway before reaching said chamber;
said first deflector means being displaceable to enlarge or restrict said radially-extending passageway, and including biassing means biassing it in the direction of restricting said passageway but displaceable by the inletted fluid in the direction of enlarging said passageway,
second deflector means between said radially-extending passageway and said chamber for deflecting the fluid in the circumferential direction before entering said chamber to produce a vortex therein for separation of the solid particles from the fluid before the fluid reaches the housing outlet;
and a dirt-purging outlet at the bottom of said chamber for purging the solid particles settling therein.

4,710,285
VERMICULITE FLOTATION PROMOTER
Anthony E. Gross, St. Charles; Richard D. Christie, Downers Grove, both of Ill., and Thomas E. Pinder, Fort Mill, S.C., assignors to Nalco Chemical Company, Naperville, Ill.
Filed Dec. 4, 1986, Ser. No. 937,843
Int. Cl.[4] B03D *1/02*
U.S. Cl. 209—166 **2 Claims**

1. A method for improving the froth flotation recovery and/or grade of vermiculite from vermiculite containing rock and clay which comprises using as an improved froth flotation collector a composition comprising oil and between 2–60% by weight of an alkyl phenol formaldehyde condensation product having 4–15 phenol nuclei with the alkyl group of said phenol having between 4–15 carbon atoms.

4,710,286
SIEVE FOR POWDER
Douglas C. Mulder, Wellington, Ohio, assignor to Nordson Corporation, Westlake, Ohio
Filed Sep. 17, 1982, Ser. No. 419,167
Int. Cl.[4] B07B *1/28*
U.S. Cl. 209—250 **1 Claim**



1. A sieve for powder comprising:
a housing formed of an upper section and a lower section, said sections having perimeter flanges,
a screen having a perimeter sandwiched between said flanges, said screen thereby extending across said housing and dividing it into an upper chamber and a lower chamber,
said screen being inclined to horizontal at an angle of about 10°,
an elongated vertically-extending cyclone housing for introducing powder carried by air under pressure into said upper chamber,
said elongated vertically-extending cyclone housing having a top cover and inclined stack section projecting vertically at an angle of about 30° to vertical from said top cover, and a downwardly and inclined stack section being at an angle of about 30° to vertical connected to the upper end of said vertical stack section to relieve the pressure of air by which the powder is introduced,
a relief port connected to the side of said housing above said screen and below said elongated vertically-extending cyclone housing,
an inclined floor at the lower end portion of said lower chamber within said housing,
a discharge port in said housing adjacent the lower end of said floor,
an inspection cover in the top of said housing overlying the lower end portion of said screen for removal of large particles resting on the lower end portion of said screen, and
a vibrator fixedly secured to said flanges and said screen sandwiched therebetween,
whereby powder carried by air under pressure entering said elongated vertically-extending cyclone housing will swirl around inside said elongated vertically-extending cyclone housing with excess air passing out of said vertical stack sections and any build up of pressure within said upper chamber being relieved by said relief port, so that the bulk of said powder will become loosened through said swirling action and will drift downwardly under the influence of gravity into said upper chamber and onto said screen so as not to blind said screen.

4,710,287

FIBROUS SUSPENSION PRESSURIZED SORTER

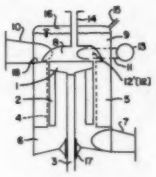
Hans-Otto Henrich, and Reimund Rienecker, both of Heidenheim, Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,424

Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519373

Int. Cl.[4] B07B *1/20*

U.S. Cl. 209—270 6 Claims



1. A sorter for fibrous suspensions comprising:

a rotationally symmetric vertically oriented screen mounted in said sorter, said screen defining an interior side and a screen outlet side radially outside said screen;

an accepts screen space on said screen outlet side;

a central drain space connected to the interior of said screen for receiving overflow material;

an accepts drain space at an axial end of said screen surrounding said central drain space, which accepts drain space has an upper part;

a constricted connection communicating between said accepts drain space and said accepts screen space, which accepts drain space receives flow through material from said accepts screen space;

a pressurized gas space in the upper part of said accepts drain space;

an outlet connected to said accepts drain space for receiving the flow through material; and

an inlet for the suspension located on the other axial end of said screen opposite said central drain space for receiving fibrous suspensions.

4,710,288

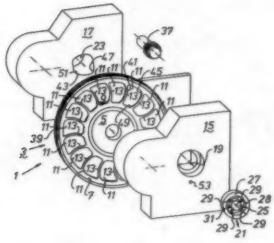
FILTRATION SYSTEM

Hubert Patrovsky, 290 Samson Blvd., #1,, Ste. Dorothee, Quebec, Canada H7X 3C1

Filed Apr. 17, 1987, Ser. No. 39,328

Int. Cl.[4] B01D *35/12*

U.S. Cl. 210—111 4 Claims



1. A filtration system for filtering a molten plastic flow flowing from a source to a tool, comprising:

a rotatable disc having an annularly arranged screening zone comprising a plurality of like cavities separated by spacing webs;

a housing for said disc comprising a first plate having a front side and a rear side, and a second plate having a front side and a rear side, said disc being rotatably mounted between said rear side of said first plate and said front side of said second plate;

a first flow-through bore in said first plate having a front side and a rear side, and a second, aligned, flow-through bore in said second plate having a front side and a rear side;

said disc being mounted in said housing such that at least one of said cavities is in alignment with said first flow-through bore and said second flow-through bore, said first flow-through bore, said second flow-through bore and said at least one cavity forming a flow-through channel;

said second flow-through bore having a preselected outer contour at the front side thereof;

said first flow-through bore comprising flow-shape forming means for causing the contour of a cross-section of said molten flow at said rear side of said first flow-through bore to correspond with said preselected outer contour.

4,710,289

CHROMATOGRAPHY PRECOLUMN

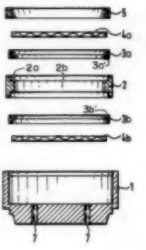
Stefan Wermuth, Darmstadt; Günter Hauke, Mühltal, and Klaus Kreber, Münster, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Feb. 27, 1987, Ser. No. 19,737

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606474

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—198.2 2 Claims



1. A precolumn for use with a chromatography column, the precolumn comprising:

an outer annular casing defining a circular chamber of a selected internal diameter, having first and second ends with the first end being completely open to accommodate the end of the chromatography column and the second end being enclosed by a wall with openings therethrough for admitting eluent;

a first and a second frit element received in the circular chamber; the first frit element being in abutment with the wall, the second frit element being axially spaced from the wall; each first frit element having a diameter less than that of the chamber;

first and second annular sealing members having internal diameters approximately that of the frit elements, external diameters less than that of the circular chamber and a shoulder with an internal diameter less than that of the frit elements;

a column ring having an external diameter proximate the internal diameter of the circular chamber and an internal diameter proximate the external diameter of the annular sealing members, the ring further having an internal annular shoulder spaced from the edges thereof a distance equal to the axial dimension of the sealing members, whereby the sealing members nest between the respective frits and the column ring while the column ring nests within the circular chamber with a space defined by the shoulder between the frits;

a bed of sorbent disposed in the space defined by the shoul-

der projecting from the column ring and retained between the first and second frits, and

an elastic sealing ring disposed in the circular space between the second end of the outer annular casing for effecting a seal between the precolumn and the chromatography column.

4,710,290

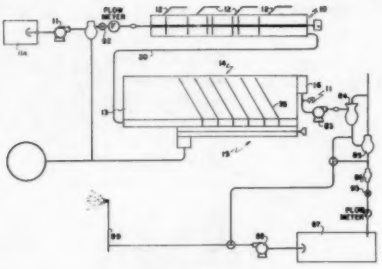
FLUID CLARIFYING ASSEMBLY

Raymond P. Briltz, Regina, Canada, assignor to 3M Holding Co. Ltd., Regina and Magill-Stephenson Company Limited, Winnipeg, both of, Canada, a part interest

Filed Aug. 22, 1985, Ser. No. 768,247

Int. Cl.[4] C02F *1/52*; B01D *21/08*

U.S. Cl. 210—199 **26 Claims**



1. A fluid clarifying assembly comprising in combination a mixing tube assembly, a fluid intake at one end thereof, a fluid outlet at the other end thereof, a plurality of selective and discrete chemical injection means for the flocculation and precipitation of materials contained in said fluid, operatively connected to said mixing tube assembly, said flocculating and precipitation of materials forming a sludge, and a main shaft journalled for rotation within said mixing tube assembly, said discrete chemical injection means being operatively connected to said shaft, chemical injection nozzles along the length of said shaft, separate conduits extending through said shaft and communicating between individual chemical injection means and individual injection nozzles and mixing means on said shaft, a sedimentation extraction assembly, means operatively connecting said mixing tube assembly to one end of said sedimentation extracting assembly, said sedimentation extraction assembly including an elongated separating tube, said means operatively connecting said mixing tube assembly to said one end of said sedimentation extracting assembly being operatively connected to one end of said separating tube, a plurality of baffles along the length of said separating tube guiding the sludge towards the base of said separating tube, means at the base of said separating tube to remove sludge therefrom, said baffles including means at the upper side thereof forming a passage with the upper wall of said separating tube, said upper sides acting as weirs and means for removing clarified fluid flowing over said weirs from the other end of said sedimentation extraction assembly.

4,710,291

TWO-STAGE APPARATUS FOR CLARIFYING LIQUID CHARGED WITH SOLID MATTER

Elie Condolios, Grenoble, France, assignor to Alsthom, Paris, France

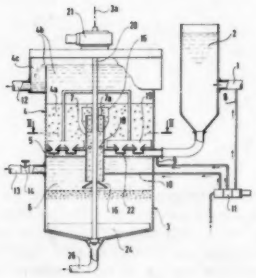
PCT No. PCT/FR85/00211, § 371 Date Mar. 31, 1986, § 102(e) Date Mar. 31, 1986, PCT Pub. No. WO86/00879, PCT Pub. Date Feb. 13, 1986

PCT Filed Jul. 31, 1985, Ser. No. 859,983

Claims priority, application France, Jul. 31, 1984, 84 12141

Int. Cl.[4] B01D *21/08*

U.S. Cl. 210—199 **6 Claims**



1. Sludge belt clarification apparatus for receiving a cloudy liquid charged with fine solid particles in suspension to provide firstly a clarified liquid and secondly a sludge, said apparatus comprising:

a clarification chamber (**4**);

a distribution chamber (**5**) extending under said clarification chamber;

means (**8**, **9**, **11**) for adding a flocculation additive to said cloudy liquid in such a manner as to provide a mixture in which said fine particles meet one another and bind together with the aid of said additive to form flakes;

means (**2**) for inserting said mixture into said distribution chamber while setting up a substantially uniform pressure therein;

a plurality of injectors (**22**) distributed over the bottom area of the clarification chamber, each injector having an axis (**22*a***) and being provided with guide means, and each of said injectors communicating the distribution chamber with the clarification chamber for continuously inserting said mixture into the bottom of said clarification chamber with a flow which is distributed over the area of said chamber;

an orifice (**4*b***) for continuously removing clarified liquid from the upper portion of the clarification chamber (**4**); and

an orifice (**26**) for continuously removing sludge below said orifice for removing clarified liquid;

the flowrate through said injectors being chosen in such a manner as to form a belt of sludge (**4*a***) above said injectors through which belt a mixed cloudy liquid rises between the already-formed flakes such that the fine particles still in suspension in said liquid bind to said flakes to increase the volume thereof and such that the liquid which arrives above said sludge belt is clarified and forms a layer of clarified liquid (**4*a***);

the improvement wherein said apparatus further comprises a thickening chamber (**3**) for thickening the sludge from said sludge belt and constituting a secondary stage with said clarification chamber constituting a primary stage, said thickening chamber being disposed below the clarification chamber and being co-extensive therewith; and

a central vertical well (**7**) having a high inlet (**7*a***) for receiving an overflow of flakes from the top layer of said sludge belt and for limiting the height thereof, a low inlet consti-

tuted by at least one hole (18) in the clarification chamber (4) at the bottom thereof for receiving large dense agglomerates of flakes formed in the sludge belt, and an intermediate height outlet into said thickening chamber (3);

first conveying means for conveying said large dense agglomerates from the bottom surface of said clarification chamber towards said central well low inlet;

said thickening chamber including an outlet for clarified water (13) higher than the outlet from said central well, an outlet for sludge (26) in the lower portion thereof;

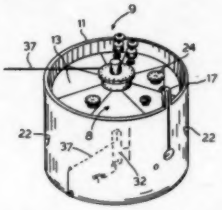
and second conveying means for conveying thickened sludge from the bottom surface of said thickening chamber towards said sludge outlet.

4,710,292

DIGESTER TANK WITH FOAM CONTROL COVER

Jerry DeVos, Montville, N.J., assignor to Atara Corporation, Quebec, Canada

Filed Aug. 18, 1986, Ser. No. 897,088
Int. Cl.[4] C02F *11/04*
U.S. Cl. 210—218 **14 Claims**



1. In apparatus for carrying out chemical reactions involving a liquid phase and a gas phase, wherein there is formation of foam above the liquid phase, the apparatus comprising a reactor vessel having an enclosed sidewall and bottom and designed to contain a liquid and a gas; a floating cover vertically movably maintained within the vessel and having a lower ceiling surface extending transversely across the vessel within the sidewall and designed to be supported above the level of liquid in the vessel; gas withdrawal conduit means located within the vessel and designed to permit the passage of gas between the vessel and the exterior of the vessel; and gas pressure controlling means for limiting the pressure below the floating cover within the vessel by controlling the flow of gas through the gas withdrawal conduit means;

the improvement which comprises a gas-filled buoyancy chamber rigidly connected to and located below the floating cover and within the vessel and designed to partially support the floating cover above liquid within the vessel; and a variable level liquid/foam withdrawal member, ridigly supported from and below the floating cover, and defining a withdrawal opening, located within the vessel and below the uppermost portion of the buoyancy chamber, and withdrawal conduit means connecting the withdrawal opening to the exterior of the vessel, to control the passage of foam and liquid betwen the vessel and its exterior; wherein the floating cover and the withdrawal opening, moving together, can be maintained at a desired height relative to the surface of the liquid so as to permit the removal of any proportion of foam and sludge floating on the surface of the liquid.

4,710,293

FILTER CLOTH CAKE REMOVAL DEVICE

Steven S. Davis, Farmington, Utah, assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Dec. 9, 1985, Ser. No. 806,656
Int. Cl.[4] B01D *25/32*
U.S. Cl. 210—225 **8 Claims**

1. An apparatus for removing filter cake in a filter press having a plurality of filter plates mounted within a frame; said filter plates being adapted for opening, including first and second adjacent filter plates, a pair of scissor-like suspension arms pivotedly mounted to each pair of adjacent filter plates an elongate horizontal first rod mounted above and between each pair of said adjacent filter plates, and a filter cloth, folded over the horizontal rod, and secured to the first and second filter plates, said apparatus comprising:

a second elongate rod mounted above said filter press and parallel said first rod, said second rod being connected to said first horizontal rod by means of a cable; said first rod being positioned to suspend said filter cloth in a tensioned, substantially inverted "V"-shaped configuratrion between any opened said first and second filter plates; and

a return means mounted on each filter plate for rapidly returning said second rod to an equilibrium position subsequent to a displacement of said second rod; said return means comprising:

a first compression plate mounted on said suspension arms;

a first spring mounted on top of said first compression plate;

an elongate first shaft mounted on said second horizontal rod, having a first longitudinal axis; said first shaft extending through said first compression plate and through said first spring;

a second compression plate mounted on said elongate shaft wherein said first spring is positioned between said first and second compression plate; wherein a displacement of said second rod in a first direction effects a compression of said first spring along said first longitudinal axis;

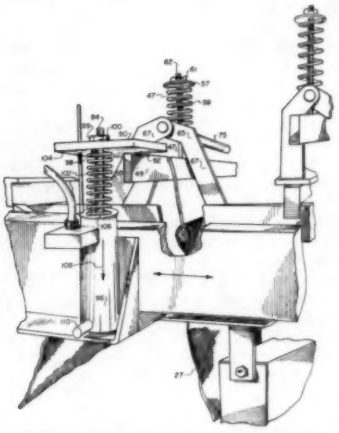
a carriage mounted to slide along said frame;

an impact-loading means mounted on said frame said impact loading means comprising:

a first pneumatically operated cylinder having a second shaft, reciprocally slidable piston mounted therein; wherein said piston is driven in a first direction upon pressurized air being supplied to said cylinder;

a second spring mounted on said cylinder and over said second shaft wherein said second shaft extends through said second spring;

a third compression plate mounted on said second shaft



wherein said second spring is mounted between said third compression plate and said cylinder wherein a displacement of said second shaft in said first direction effects a compression of said second spring; along said second longitudinal axis;

wherein a pneumatic pressure is applied to said piston inducing a displacement of said piston effecting a first direction displacement of said third compression plate with a corresponding displacement of said second rod; said second spring being compressed by said third com-

pression plate's first direction displacement; said first rod being displaced in said first direction under the force of gravity as said second rod is displaced in said first direction; said first rod's first direction displacement operating to ease any tension applied to said filter cloth by said first horizontal rod;

wherein, thereafter; upon said pneumatic pressure on said piston being released, said second spring effects a rapid displacement of said third compression plate in said second direction thereby applying a sudden impact, tensioning load to said filter cloth through a displacement of said second horizontal rod in a second direction to effect a snapping motion in said filter cloth and thereby remove said filter cake from said filter cloth.

4,710,294

ROTARY DISK FILTER ELEMENT

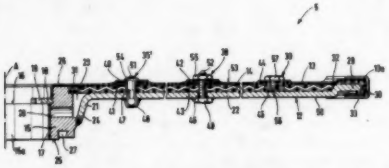
Josef Ziller, Waldstetten, Fed. Rep. of Germany, assignor to Schenk Filterbau Gesellschaft mit beschränkter Haftung, Waldstetten, Fed. Rep. of Germany

Filed Nov. 22, 1985, Ser. No. 801,009

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1984, 3442870

Int. Cl.[4] B01D *33/26*

U.S. Cl. 210—232 **13 Claims**



1. A rotary disk filter element for a liquid filter with depth effect; said filter element comprising:

a retaining member;

a collar member disposed inwardly of said retaining member and having at least one supply opening for wash liquid;

a closed base plate in the form of a ring-like member disposed between said retaining member and said collar member;

a support fabric placed on said base plate;

at least one filter fabric placed on said support fabric on a side thereof remote from said base plate; said filter fabric having a radially outer portion secured to said base plate via said retaining member in a radially outer fastening zone; said filter fabric also having a radially inner portion secured by said collar member in a radially inner fastening zone, with said filter fabric communicating with said supply opening of said collar member so that filter residue can be removed from said filter fabric during general cleaning thereof by having said wash liquid flush through said filter fabric in a direction opposite to the direction of filtration; and

securing means for securing said filter fabric to said support fabric and to said base plate at a plurality of point locations in a radial region between said radially inner fastening zone and said radially outer fastening zone particularly for avoidance of an over-expansion of said filter fabric during said flushing.

4,710,295

SEPTIC TANK FILTERS

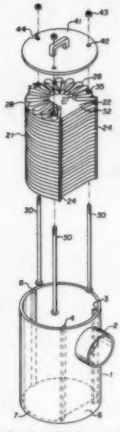
Robert Zabel, 9315 Fairground Rd., Louisville, Ky. 40291

Continuation-in-part of Ser. No. 639,129, Aug. 9, 1984, abandoned. This application Sep. 9, 1985, Ser. No. 778,349

Int. Cl.[4] B01D *25/02*

U.S. Cl. 210—336 **4 Claims**

1. A filter unit for use in cylindrical casing means adapted to be disposed in a septic tank including: a plurality of stacked disc-dam units to form a cartridge having a longitudinal axis where each disc-dam unit has a generally circular planar base with a chord segment cut away to form a chord edge where the chord edges of each disc-dam is in mutual alignment and first and second sealing edges are formed at the respective ends of the chord edge and the first and second sealing edges are parallel to the longitudinal axis and where each base includes a continuous elongate dam located on one side of the base and extending outwardly therefrom to terminate at a dam top where the elongate dam has a dam first end adjacent said first sealing edge and extends continuously to a dam second end at said second sealing edge to divide said base into an upstream and downstream side; retaining device to hold at least two



disc-dam units in stacked relation with the dam top of one disc-dam unit facing one surface of the next base opposite the side carrying the dam wherein said casing means is of selected diameter to receive said filter unit with said longitudinal axis of said filter unit in generally coincident relation with said longitudinal axis of said casing and wherein said casing means includes first and second longitudinal seal means extending generally parallel to said longitudinal axis in spaced relation to engage said first and second sealing edges and outlet means whereby said outlet means communicating with said outlet of said casing.

4,710,296

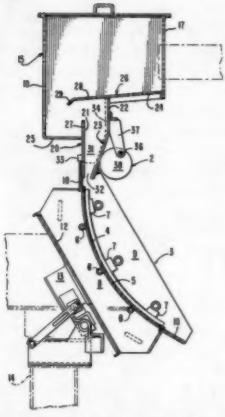
STATIC SIEVE FEED CONTROL

James D. Connolly, P.O. Box 5329, Princeton, W. Va. 24740

Filed Sep. 4, 1986, Ser. No. 903,560

Int. Cl.[4] B01D *25/04*

U.S. Cl. 210—420 **6 Claims**



1. In a static sieve assembly, the combination with a housing mounting a screen and a feed box for feeding a solid-liquid

mixture to the screen, of a feed control device for controlling the rate of discharge of said mixture from said box to said sieve comprising a discharge spout on said feed box for discharging said mixture therefrom onto and across said screen, said spout having front and rear walls together bounding opposite sides of a passage tapering downwardly to a discharge outlet, said front wall having a lower part, elastomeric means connecting said parts for relative horizontal angling, and means mounted on said feed box and acting on said lower part for selectively adjusting the cross-sectional area of said outlet between said walls.

4,710,297

FLUID FILTER WITH PLEATED FILTER MEDIUM

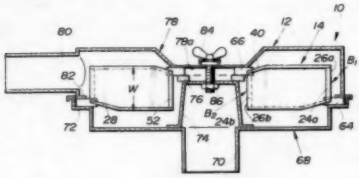
Mitsutoshi Suzuki, Kawagoe; Yoshitaka Morita, Fussa; Masami Okada, Ichikawa, and Jun Shimohara, Kamifukuoka, all of Japan, assignors to Kabushiki Kaisha Tsuchiya Seisakusho, Tokyo, Japan

Filed Mar. 28, 1986, Ser. No. 845,842

Claims priority, application Japan, Jun. 15, 1985, 60-130356; Sep. 30, 1985, 60-218836; Nov. 29, 1985, 60-184344[U]; Dec. 28, 1985, 60-297388

Int. Cl.⁴ F02M *35/00*

U.S. Cl. 210—493.2 **31 Claims**



1. A fluid filter for an automotive engine, comprising a filter element including a pleated filter medium having a plurality of pleats, said plurality of pleats defining adjacent pairs of first and second pleats, each pleat having first and second sides which are integrally connected through a first score line with each other to form an upwardly-pointing pleat portion, the second side of said first pleat and the first side of said second pleat being integrally connected through a second score line with each other to form a downwardly-pointing pleat portion, each pleat side having oppositely located first and second end sections which have first and second edges, respectively, which extend substantially perpendicular to each score line, the first end sections of said first and second sides of each pleat being approached and bonded to each other to form a plurality of first bonded sections, the second end section of said first pleat second side and the second end section of said second pleat first side, of said adjacent pairs of first and second pleats, being approached and bonded to each other to form a plurality of second bonded sections.

4,710,298

AUXILIARY FOR DEWATERING OF SLUDGE

Kimihiko Noda, Uji; Yoji Fujiura, Kyoto, and Yoichi Hasegawa, Joyo, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

PCT No. PCT/JP84/00214, § 371 Date Dec. 3, 1985, § 102(e) Date Dec. 3, 1955, PCT Pub. No. WO85/04857, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 24, 1984, Ser. No. 812,886

Int. Cl.⁴ B01D *39/04*

U.S. Cl. 210—505 **14 Claims**

1. An auxiliary for dewatering a sludge, comprising a separability improving amount of at least one cationic polymeric flocculant and at least one organic fibrous material having the bulk specific gravity thereof increased to at least 0.3 g/cm³ by being pressed, wherein the weight ratio of said flocculant to said fibrous material is 1:01 to 1:1000, and wherein said fibrous material has a density not more than 0.1 g/cm³ before being pressed.

4,710,299

CYCLONE SEPARATOR

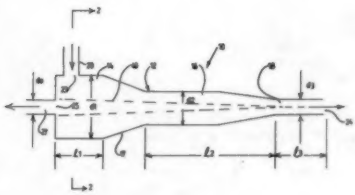
Gavan J. J. Prendergast, Glen Iris, Australia, assignor to Noel Carroll, Sherbrooke, Australia

Continuation-in-part of Ser. No. 776,164, filed as PCT AU85/0001, Jan. 24, 1985, published as WO85/03242, Aug. 1, 1985, abandoned. This application Apr. 4, 1986, Ser. No. 848,385

Claims priority, application Australia, Jan. 24, 1984, PG3311/84; Canada, Jan. 24, 1985, 472531; Australia, Apr. 4, 1985, 40909/85

Int. Cl.⁴ B04C *5/081*

U.S. Cl. 210—512.1 **25 Claims**



1. A cyclone separator for separating denser components of a fluid mixture from less dense components thereof, said separator comprising: means for permitting provision of only a single inlet opening in an axially extending separating chamber having towards one end inlet means for admission of the mixture with a tangential flow component, the separating chamber having an axially positioned overflow outlet adjacent said one end and said separating chamber of generally tapered form with a relatively larger cross-sectional size at said one end and a relatively small cross-sectional size at an axially positioned underflow outlet at the end of the separating chamber opposite said one end, including means for directing the denser component to the underflow outlet in a fashion such as to encompass an inner axially positioned core of the less dense component which is subjected at least over a substantial part of its length to a pressure differential causing it to flow to the overflow outlet, said inlet means being defined by a portion of the separating chamber and at least one inlet tract communicating with said portion, said portion being that portion of the separating chamber which is at the same lengthwise position as the or each inlet tract, wherein the or each inlet tract includes means for presenting inner and outer profiles, when viewed axially of the separator, said outer profile extending from a first location at which it meets the circumference of said portion of the separating chamber and at least the inward projection of said inner profile extending from a second location at which the inner profile or its said projection meets said circumference, said outer profile being dimensioned so that a first vector T describing the location of any particular point on said outer profile and contained in a plane normal to said axis, and having its origin at said first location, is such that as the magnitude of the vector T increases, an angle θ between the vector T and that tangent to said circumference which passes through said first location never decreases substantially and never becomes less than negative 0.1 radian; the cross-sectional area perpendicular to the direction of flow generally contracting in the direction of flow.

4,710,300

METHOD FOR PROCESSING OF ORGANIC MATERIALS CONTAINING NITROGEN COMPOUNDS

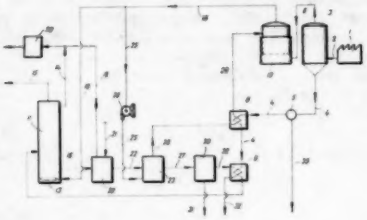
Jaroslav Kristoufek, Prague, Czechoslovakia, assignor to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation of Ser. No. 269,710, Jun. 2, 1981, abandoned, which is a continuation-in-part of Ser. No. 119,142, Feb. 5, 1980, abandoned. This application May 5, 1983, Ser. No. 491,980

Claims priority, application Czechoslovakia, Oct. 29, 1976, 6994-76

Int. Cl.[3] **C02F** *3/28, 1/04*

U.S. Cl. 210—603 **7 Claims**



1. A method of producing concentrated nitrogen compounds, phosphate containing concentrate and clear water from a liquid component obtained after anaerobic digestion of organic compounds in waste waters containing nitrogen in the form of ammonium salts of carbonic acid comprising the sequential steps of:

(a) heating the liquid component to a boiling temperature;

(b) subjecting the heated liquid component to a rectification thereby producing gaseous fractions of ammonia, carbon dioxide and water, and a tail fraction;

(c) isolating the gaseous fractions separately or as compounds formed by their chemical reaction as ammonium carbonate and ammonium water, and isolating the tail fraction with the residual content of less than 200 mg NH_3 bonded as ammonium salts thereto per 1 kg of the tail fraction;

(d) alkalizing the tail fraction by adding an equivalent of lime up to 20 g CaO per 1 kg at a temperature of 60° to 100° C., while simultaneously draining any residual ammonia;

(e) carbonating with carbon dioxide the alkalized product to a final value of 0.01 to 1.5 g CaO per 1 kg; and

(f) separating an organo-phosphate-lime concentrate and clear water.

4,710,301

WASTEWATER PURIFICATION PROCESS

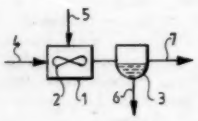
Luc Geuens, Brussels, Belgium, assignor to S.A. Innovi N.V., Belgium

Filed Aug. 29, 1986, Ser. No. 901,649

Claims priority, application Netherlands, Sep. 30, 1985, 8502677

Int. Cl.[4] **C02F** *3/30*

U.S. Cl. 210—605 **9 Claims**



1. A process for the purification of wastewater to remove metals, colorants, detergents, phenols and other cationic contaminates comprising the steps of:

(a) contacting for about 5 to 20 minutes said wastewater with completely anaerobic fermented oxidative biological water purification sludge which has been fermented for at least 20 days and is substantially free of viable microorganisms in order to adsorb metals, colorants, detergents, phenols and cationic contaminates from said wastewater onto said sludge, and

(b) separating said sludge from said wastewater after said contact.

4,710,302

PROCESS FOR THE SEPARATION OF THE WATER RESULTING DURING THE COKING PROCESS INTO A SMALL SALT-RICH FRACTION AND A LARGE SALT-POOR FRACTION

Georg Pollert, Essen, Fed. Rep. of Germany, assignor to Bergwerksverband GmbH, Essen-Kray, Fed. Rep. of Germany

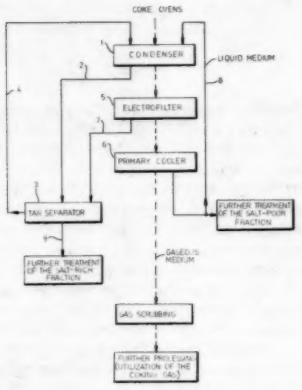
PCT No. PCT/EP85/00298, § 371 Date Feb. 14, 1986, § 102(e) Date Feb. 14, 1986, PCT Pub. No. WO86/00332, PCT Pub. Date Jan. 16, 1986

PCT Filed Jun. 19, 1985, Ser. No. 833,388

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1984, 3423798

Int. Cl.[4] **C02F** *5/00;* **C10K** *1/00*

U.S. Cl. 210—696 **2 Claims**



1. A process for the treatment of hot crude gas resulting from a coking operation, comprising the steps of:

(a) cooling said hot crude gas in a condenser to produce a tar-containing and a water-containing condensate and a gas phase;

(b) electrofiltering particulates from the gas phase produced in step (a) to produce a discharge and a filtered gas;

(c) subjecting said filtered gas to primary cooling to condense water therefrom in a salt-poor fraction of the total water contained in said hot crude gas and suitable for use as service water in a coking plant;

(d) combining said water-containing condensate from step (a) with said discharge from step (b) in a tar separator and recycling a tar and salt containing recycle from said tar separator to said condenser;

(e) withdrawing from said tar separator a salt-rich fraction of the total water contained in said hot crude gas for further treatment; and

(f) feeding a quantity of said salt-poor fraction of the water from step (c) to said condenser to prevent buildup of deposits therein.

4,710,303
LOW MOLECULAR WEIGHT POLYVINYL SULFONATE FOR LOW PH BARIUM SULFATE SCALE CONTROL

Daniel H. Emmons, Rosenberg, Tex., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Aug. 14, 1986, Ser. No. 896,354
Int. Cl.⁴ C02F *5/10*
U.S. Cl. 210—698 **2 Claims**

1. A method of preventing the formation of barium sulfate scale deposited by aqueous produced or injection fluids having a pH below 7.5 which are recovered with or are used to recover petroleum from underground formations which comprises treating these aqueous fluids with from 1–25 ppm by weight of a low molecular weight water-soluble polyvinyl sulfonate which has a molecular weight within the range of between 500–10,000 and containing a minimum of 90 mole percent of vinyl sulfonate monomer.

4,710,304
METHOD FOR IMPROVING THE UTILIZATION OF POLYELECTROLYTES IN DEWATERING AQUEOUS SUSPENSIONS

James J. Lang, Springfield, Oreg., assignor to Joseph J. Campbell and Equivest, Inc., both of Prairie Village, Kans.

Continuation-in-part of Ser. No. 674,782, Nov. 26, 1984, abandoned. This application Jul. 8, 1986, Ser. No. 883,085
Int. Cl.⁴ C02F *1/56*
U.S. Cl. 210—734 **12 Claims**

1. The process for dewatering a stream of an aqueous suspension which comprises:

forming a mixture of a water-soluble polyelectrolyte with a molecular weight above about 1,000,000 and water

aging said mixture for a period of at least six hours to prepare an aged solution of said polyelectrolyte

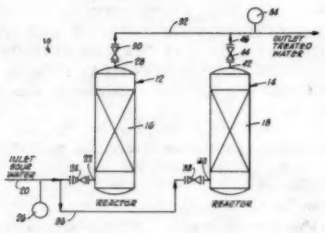
adding an amount of said aged solution to said aqueous suspension approximately equal to the minimum effective amount required to flocculate and dewater said aqueous suspension, and

dewatering said aqueous supsension.

4,710,305
PROCESSES AND OXIDIZING AGENTS FOR OXIDIZING SULFIDE ION TO INNOCUOUS, SOLUBLE SULFUR SPECIES

Joe D. Allison, and J. W. Wimberley, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Dec. 29, 1986, Ser. No. 947,327
Int. Cl.⁴ C02F *1/76*
U.S. Cl. 210—747 **32 Claims**



1. A process for oxidizing sulfide ion found in sour water to innocuous, soluble sulfur species, comprising:

contacting said sour water with a nitrogen halogenated triazine or a nitrogen halogenated derivative thereof for a period of time sufficient to convert said sulfide ion to soluble sulfur species.

13. A process of removing sulfide ion from oil field produced sour water, comprising the steps of:

directing said water into a reaction chamber containing a nitrogen halogenated triazine or a nitrogen halogenated derivative thereof, whereby said water is contacted with said nitrogen halogenated triazine or nitrogen halogenated derivative thereof and said sulfide ion is converted into sulfate ion within said chamber; and

withdrawing said water from said chamber to a place of disposal.

21. In a secondary recovery process for the recovery of hydrocarbons from a subterranean formation wherein an aqueous solution is directed into said formation by way of one or more injection wells, and hydrocarbons and sour water are recoverd from said formation by way of one or more production wells, the improvement comprising contacting said sour water with a nitrogen halogenated triazine or a nitrogen halogenated derivative thereof for a period of time sufficient to convert sulfide ion contained therein to innocuous, soluble sulfur species.

4,710,306
REMOVING OR DECREASING IRON-CAUSED YELLOW COLOR IN A SOLUTION

Warren B. Kirsch, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Jan. 22, 1985, Ser. No. 693,661
Int. Cl.⁴ B01D *21/00*; E21B *43/00*
U.S. Cl. 252—8.551 **20 Claims**

1. A process for removing or decreasing the amount of iron-caused yellow color in a solution, comprising adding to the solution a decolorizing agent, which is a soluble aluminum salt which forms a very insoluble hydroxide at the near neutral pH point, in a sufficient amount to remove or decrease the amount of color present in said solution after the solution has been neutralized and filtered, raising the pH of the solution containing the soluble salt to near neutral, and filtering the near neutral pH solution to remove any precipitate in said solution, thereby forming a substantially clear solution.

4,710,307
PICKLING AGENT

Jacques Périard, Sins, and Alain Cron, Hildesrieden, both of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Continuation-in-part of Ser. No. 757,307, Jul. 22, 1985, abandoned. This application Aug. 11, 1986, Ser. No. 895,384
Claims priority, application Switzerland, Jul. 23, 1984, 3570/84
Int. Cl.⁴ C10M *125/00*
U.S. Cl. 252—18 **28 Claims**

1. Agent for the pickling of and as an antioxidant for a workpiece made of iron and/or steel which is subjected to non-cutting, hot transformation, comprising:

(a) 20 to 80 percent by weight of one or more effective pickling compounds selected from the group consisting of: $Na_2B_4O_7 1OH_2O$, $Na_2B_4O_7.5H_2O$, anhydrous $Na_2B_4O_7$, $NaBO_2.4H_2O$, boric acid, boric acid anhydride, soluble sodium silicate having a SiO_2/Na_2O ratio of 2.5 to 3.3, and sodium metasilicate, anhydrous or having 5 to 9 molecules of water of crystallization;

(b) 1 to 75 percent by weight of one or more dry substances selected from the group consisting of: graphite, calcium fluoride, cryolite, antimony oxide, molybdenum disulfide, boron nitride, and at least one phosphate selected from the group consisting of: hydrated or anhydrous trisodium phosphate, hydrated or anhydrous tripotassium phosphate, sodium metaphosphate, potassium metaphosphate, polymetaphosphate, hydrated or anhydrous sodium tripolyphosphate, sodium polyphosphate, and zinc phosphate.

(c) 5 to 79 percent by weight of one or more substances selected from the class consisting of group (d), group (e) and group (f);

(d) zero to 35 percent by weight of one or more additives, which act as an antioxidant and which influence the for-

mation of a layer, of group (d) selected from the group consisting of: coke, powdery carbon, cellulose in the form of a powder, sawdust, starch or one of its derivatives, paraffin or a wax, a fatty acid and/or a salt thereof, colophonium or one of its derivatives, and a synthetic resin based on one or more hydrocarbons having 5 to 10 carbon atoms, a terpene resin, and an indene-coumaron resin;

(e) zero to 50 percent by weight of one or more substances, which control the physical characteristics of the agent, of group (e) selected from the group consisting of: magnesium chloride, sodium chloride, potassium chloride, calcium chloride, sodium sulfate, sodium acetate, potassium acetate and a clay; and

(f) zero to 5 percent by weight of one or more substances, which act on the reduction of the oxide of group (a) and act in a separating manner, of group (f) selected from the group consisting of: ammonium chloride, urea, ammonium carbonate, a urea-formaldehyde resin and sodium carbonate, said agent being in dry form having no added liquid and being solid at room temperature.

4,710,308

PROCESS FOR PREPARING OVERBASED SULFURIZED PHENATES

Richard D. Stauffer, Wheaton, Ill., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 366,428, Apr. 8, 1982, abandoned. This application Apr. 18, 1984, Ser. No. 601,476

Int. Cl.[4] C10M *129/00*

U.S. Cl. 252—42.7 **5 Claims**

1. A process for the manufacture of overbased sulfurized phenates comprising:

(a) contacting at a temperature of between about 200° F. to about 400° F., a composition comprising a hydrocarbyl substituted phenol, sulfur and an alkaline earth metal oxide or hydroxide wherein the molar ratio of hydrocarbyl substituted phenol to sulfur is 1:1–1.8, and wherein the amount of alkaline earth metal oxide or hydroxide added is from 0.40 to about 0.75 moles per mole of hydrocarbyl substituted phenol; and

(b) contacting the composition of (a) with an additional amount of alkaline earth metal oxide or hydroxide and carbon dioxide, wherein the molar ratio of carbon dioxide to overbasing alkaline earth metal oxide or hydroxide is from about 0.70 to about 0.95 and wherein the molar ratio of hydrocarbyl substituted phenol to alkaline earth metal oxide or hydroxide is about 1:0.5–1.8.

4,710,309

LIGHTWEIGHT SOUNDPROOFING, INSULATION AND FIREPROOFING MATERIAL AND METHOD

Dennis C. Miller, Lowell, Ind., assignor to American Sprayed-On Fibers, Inc., Merrillville, Ind.

Filed Dec. 4, 1986, Ser. No. 937,929

Int. Cl.[4] E04B *1/88*

U.S. Cl. 252—62 **39 Claims**

10. A lightweight soundproofing, insulation and fireproofing material, comprising:

a dry composition including:

about 60–80% by weight of an inorganic lightweight non-flammable fibrous material;

about 16.67–36.67% by weight of an organic lightweight normally-flammable fibrous material; and

about 3.33–10% by weight of a refracted clay material;

said refracted clay material reducing the flammability of said normally-flammable fibrous material; and

a liquid adhesive including:

liquid sodium silicate having a ratio of silicon dioxide to sodium oxide that is greater than 3.22:1;

said liquid adhesive being adapted retain said dry composition on a surface in a fireproof manner.

4,710,310

ELECTROLYTE FOR ELECTROLYTIC CAPACITOR

Fumihiko Shinozaki, and Yutaka Yokoyama, both of Ome, Japan, assignors to Nippon Chemi-Con Corp., Japan

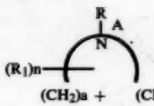
Filed Jan. 21, 1987, Ser. No. 5,759

Claims priority, application Japan, Jan. 24, 1986, 61-12048; Jan. 24, 1986, 61-12049

Int. Cl.[4] H01G *1/00*

U.S. Cl. 252—62.2 **6 Claims**

1. An electrolyte for electrolytic capacitors containing within an aprotic solvent a fluorocomplex acid salt of a N-heterocyclic compound of general formula,



in which R is H or C_xH_{2x+1} or $(C_xH_{2x+1})_2$; R_1 is alkyl group having 1 to 5 carbon atoms; n is an integer of 0 to 3; a plus b equals 4 or 5; A is fluorocomplex acid, provided that (CH_2) and (CH) take any arrangement, and when a plug b equals 4, x is 1 and both n and b are 0, and when a plus b equals 5, x is an integer of 1 to 6 and both n and b are an integer of 0 to 3.

4,710,311

PIEZOELECTRIC CERAMIC COMPOSITION

Toshio Ogawa, Kyoto, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Apr. 7, 1986, Ser. No. 849,026

Claims priority, application Japan, Apr. 11, 1985, 60-78088

Int. Cl.[4] C04B *35/49*

U.S. Cl. 252—62.9 **1 Claim**

1. A piezoelectric ceramic composition consisting essentially of a main component consisting of lanthanum modified lead titanate and lead stanate antimonate, and an auxiliary component consisting of manganese oxide, the composition containing 98 to 99.9 mole % of the main component when expressed by the general formula:

$$yPb(Sn_{\frac{1}{4}}Sb_{\frac{1}{4}})O_3-(1-y)(Pb_{1-3x/2}La_x)TiO_3$$

(where $0.01 \leqq x \leqq 0.06$ and $0.01 \leqq y \leqq 0.06$), and 0.1 to 2 mole % of manganese oxide when converted into an amount of MnO_2.

4,710,312

STABLE MIXTURES OF CHLOROFLUOROHYDROCARBONS AND SOLVENTS AND THEIR USE AS HEAT TRANSFER COMPOSITIONS FOR ABSORPTION HEAT PUMPS

Bernard Genest, Paris, France, assignor to Gaz de France, France

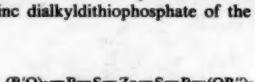
Filed Jul. 3, 1985, Ser. No. 751,783

Claims priority, application France, Jul. 6, 1984, 84 10813

Int. Cl.[4] C09K *5/04*

U.S. Cl. 252—68 **17 Claims**

1. Stable heat transfer compositions for use as heat transfer fluids in absorption heat pumps of the type comprising a chlorofluorohydrocarbon as the heat transfer agent and an amide or glycol ether solvent, said composition containing a stabilizer which is a zinc dialkyldithiophosphate of the chemical formula:



in which R' and R'', which are identical or different, and

represent alkyl, aryl, alkylaryl or arylalkyl radicals containing at least 3 carbon atoms.

4,710,313

DETERGENT COMPOSITION FOR CONTACT LENSES

Nobuyuki Miyajima; Kenji Hata, both of Tokyo, and Junichi Nakayama, Chiba, all of Japan, assignors to Lion Corporation, Tokyo and Toyo Contact Lens Co., Ltd., Nagoya, both of, Japan

Filed Jun. 12, 1986, Ser. No. 873,351

Claims priority, application Japan, Jun. 26, 1985, 60-139799

Int. Cl.[4] C11D *7/32, 7/42*

U.S. Cl. 252—105 **3 Claims**

1. A detergent composition used for cleaning contact lenses, which comprises 0.005 to 10% by weight of (A) at least one glycosidase selected from the group consisting of cellulase, pectinase, and hemicellulase; 0.01 to 20% by weight of (B) at least one activator selected from the group consisting of urea, thiourea, amino acids and salts thereof, sulfurous acid alkali metal salts, hydrogen sulfurous acid alkali metal salts, thioglycerin, dithiothreitol and dithioerythritol and the balance being water.

4,710,314

DETERGENT COSMETIC COMPOSITION CONTAINING A SOAP AND CATIONIC COMPOUND

Annie Madrange, Saint Germain en Laye, and Patrick Canivet, Paris, both of France, assignors to L'Oreal, Paris, France

Filed Oct. 10, 1985, Ser. No. 786,247

Claims priority, application Luxembourg, Oct. 12, 1984, 85589

Int. Cl.[4] C11D *9/30, 3/37*

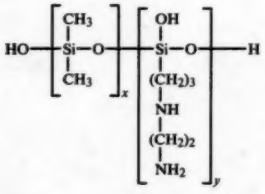
U.S. Cl. 252—117 **15 Claims**

1. Detergent cosmetic composition stable on storage, comprising in a cosmetically acceptable aqueous medium:

(a) an alkali metal or alkanolamine fatty acid soap present in proportions of between approximately 1 and 8% by weight,

(b) a silicone cationic polymer present in proportions of between 0.05 and 2.5% by weight consisting of a polysiloxane having one of the following meanings:

(i) polymers of formula:



(I)

in which x and y are integers which depend on the molecular weight, which is approximately between 5,000 and 10,000,

(ii) polymers of formula:

$$(R_1)_aG_{3-a}—Si—OSiG_2)_n[OSiG_b(R_1)_{2-b}]_mO—SiG_{3-a}(R_1)_a \quad \text{(II)}$$

in which G is chosen from the group consisting of hydrogen, phenyl, OH and C_1–C_8 alkyl, a denotes 0 or an integer from 1 to 3 and b denotes 0 or 1,

the sum n+m signifies an integer from 1 to 2,000, n denoting a number from 0 to 1,999 and m denoting a number from 1 to 2,000, R_1 is a monovalent radical of formula $C_qH_{2q}L$ in which q is an integer from 2 to 8 and L is chosen from the groups:

$—N(R_2)CH_2—CH_2—N(R_2)_2$

$—N(R_2)_2$

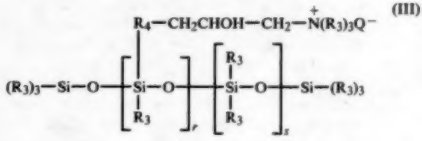
$—N^{\oplus}(R_2)_3A^{\ominus}$

$—N^{\oplus}(R_2)H_2A^{\ominus}$

$—N(R_2)CH_2—CH_2—N^{\oplus}R_2H_2A^{\ominus}$

in which R_2 denotes hydrogen or phenyl or benzyl groups, or a saturated hydrocarbon radical, and $A^{\ominus}$ denotes a halide ion, or:

(iii) polymers of formula:



(III)

in which R_3 denotes a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, R_4 denotes a divalent hydrocarbon radical, $Q^{\ominus}$ is a halide ion, r denotes an average statistical value from 2 to 20 and s denotes an average statistical value from 20 to 200,

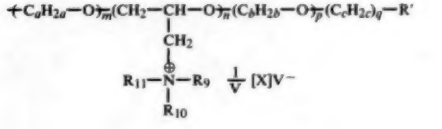
(c) a cationic surfactant used in proportions of between approximately 0.05 and 2.5% by weight and

(d) a cationic polymer present in proportions of between 0.05 and 5% by weight chosen from:

(i) a quaternary derivative of cellulose ethers corresponding to the formula:

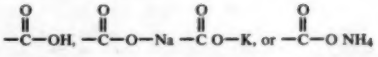
(IV)

where R_{Cell} is the residue of an anhydroglucose unit, y is a number equal to between about 50 and about 20,000 and each R individually denotes a substituent which is a group of general formula:



where

a is an integer equal to 2 or 3;
b is an integer equal to 2 or 3;
c is an integer equal to 1 to 3;
m is an integer equal to 0 to 10;
n is an integer equal to 0 to 3;
p is an integer equal to 0 to 10;
q is an integer equal to 0 or 1;
R' is a hydrogen atom or a radical of formula:



with the proviso that when p equals zero R' denotes —H; R_9, R_{10} and R_{11}, taken individually, each represent an alkyl, aryl, aralkyl, alkylaryl, cycloalkyl, alkoxyalkyl or alkoxyaryl radical, each of the radicals R_9, R_{10} and R_{11} being able to contain up to 10 carbon atoms, with the

proviso that when the radical is an alkoxyalkyl radical there are at least two carbon atoms which separate the oxygen atom from the nitrogen atom, the total number of carbon atoms present in radicals denoted by R_9, R_{10} and R_{11} being between 3 and 12;

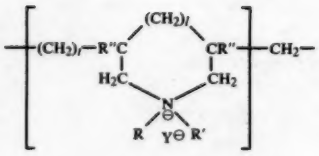
R_9, R_{10} and R_{11}, taken together, can denote, with the nitrogen atom to which they are attached, one of the following radicals: pyridine, α-methylpyridine, 3,5-dimethylpyridine, 2,4,6-trimethylpyridine, N-methylpiperidine, N-ethylpiperidine, N-methylmorpholine or N-ethylmorpholine; X is an anion;

V is an integer equal to the valency of X;

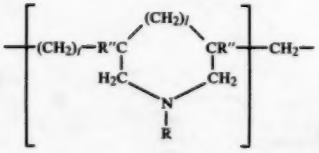
the average value of n per anhydroglucose unit in this cellulose ether is between 0.01 and approximately 1, and the average value of (m+n+p+q) per anhydroglucose unit in this cellulose ether is between approximately 0.01 and approximately 4;

(ii) a copolymer of cellulose or cellulose derivative grafted with a water-soluble quaternary ammonium monomer is a graft copolymer of hydroxyalkylcellulose with a (methacryloylethyl)trimethylammonium salt, a (methacrylamidopropyl)trimethylammonium salt or a dimethyldiallylammonium salt;

(iii) a cationic cyclopolymer having a molecular weight of between 20,000 and 3,000,000 and containing units of formulae:



(X)



(X')

in which l and t are equal to 0 or 1 and L+t=1, R″ denotes hydrogen or methyl, R and R′ denote independently of each other an alkyl group having from 1 to 22 carbon atoms, a hydroxyalkyl group in which the alkyl group has 1 to 5 carbon atoms, or a lower amidoalkyl group, and in which R and R′ can also denote, conjointly with the nitrogen atom to which they are attached, heterocyclic groups chosen from piperidinyl or morpholinyl groups, as well as copolymers containing units of formula (X) or (X') and acrylamide and diacetone acrylamide units, $Y^{\ominus}$ being an anion chosen from bromide, chloride, acetate, borate, citrate, tartrate, bisulphate, bisulphite, sulphate and phosphate.

4,710,315

ANISOTROPIC COMPOUNDS AND LIQUID CRYSTAL MIXTURES THEREWITH

Hans P. Schad, Rieden, and Stephen M. Kelly, Kaiseraugst, both of Switzerland, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

PCT No. PCT/EP85/00163, § 371 Date Dec. 16, 1985, § 102(e) Date Dec. 16, 1985, PCT Pub. No. WO85/04874, PCT Pub. Date Nov. 7, 1985

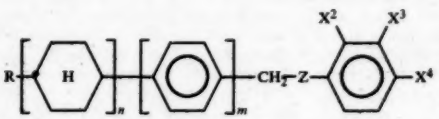
PCT Filed Apr. 13, 1985, Ser. No. 815,708

Claims priority, application Switzerland, Apr. 16, 1984, 1900/84

Int. Cl.[4] **C09K** *19/30*; **C07C** *121/00, 121/75, 121/60, 43/225, 25/18*

U.S. Cl. 252—299.63 **16 Claims**

1. A compound of the formula



in which R is an alkyl, alkoxy, or alkanoyloxy group which has in each case 1–12 C atoms in the alkyl moiety and which has a straight or branched and chiral or non-chiral chain, X^2 and X^3 are independently hydrogen, halogen or nitrile, X^4 is halogen or nitrile, Z is the ether oxygen bridge —O— and m and n are independently 0, 1 or 2 with the provisos that

(a) the sum of n and m is at least 1 and at most 3, and

(b) at least one of the groups X^2 and X^3 is not hydrogen.

4,710,316

ALDEHYDES, ACETALS, ALCOHOLS AND ETHERS HAVING 3-METHYL- OR 3,5-DIMETHYL-BENZYL GROUPS, THEIR MANUFACTURE AND PERFUME MATERIALS CONTAINING SAME

Walter Hafner, Eurasburg; Peter Ritter, Kempten; Helmut Gebauer, and Marlies Regiert, both of Munich, all of Fed. Rep. of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Fed. Rep. of Germany

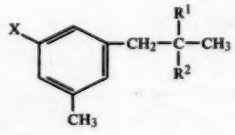
Filed Aug. 13, 1986, Ser. No. 896,019

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1985, 3531585

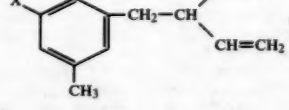
Int. Cl.[4] **A61K** *7/46, 31/13, 43/164, 47/105*

U.S. Cl. 512—20 **3 Claims**

1. A compound selected from the group consisting of a compound of formula (I)



and a compound of formula (II)



wherein

R^1 is a substituent selected from the group consisting of —OH, —CH_2OH, —CH_2—OCH_3, —CHOH—CH_3, —CHO and —$CH(OCH_3)_2$,

R^2 is methyl or ethyl,
R^3 is hydrogen or methyl,
X is hydrogen or methyl,
and wherein 2-methyl-3-(3-methylphenyl)-propan-2-ol and 2-methyl-3-(3,5-dimethylphenyl)-propon-2-ol are excluded.

4,710,317

FLAME RETARDANT POLYOLEFIN RESIN COMPOSITION

Nobuchika Tabata, and Shohji Fukumitsu, both of Ichiharashi, Japan, assignors to Chisso Corporation, Osaka, Japan

Filed May 20, 1986, Ser. No. 864,983
Claims priority, application Japan, May 28, 1985, 60-114776
Int. Cl.[4] C09K *21/00*; C08K *5/49, 5/51*
U.S. Cl. 252—609 **8 Claims**

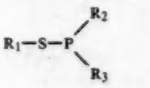
1. A flame retardant polyolefin resin composition consisting of

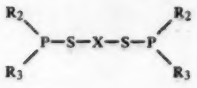
(A) 5 to 60% by weight of a halogen-containing flame retardant,

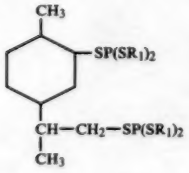
(B) 100 to 10% by weight of antimony trioxide based on the weight of said halogen-containing flame retardant,

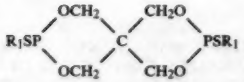
(C) 0.5 to 15% by weight of a crosslinking agent,

(D) 0.05 to 5% by weight of a thiophosphite selected from those expressed by the following formulas [I], [II], [III] and [IV]:

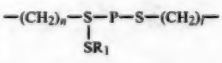

[I]


[II]


[III]


[IV]

wherein R_1 represents an alkyl group, a cycloalkyl group or an aryl group each of 6 to 20 carbon atoms; R_2 represents $—SR_2'$ or $—R_2'$; R_3 represents $—SR_3'$ or $—R_3'$; $—R_2'$ and $—R_3'$ each represent the same or different alkyl groups, cycloalkyl groups or aryl groups each of 6 to 20 carbon atoms; X represents $—(CH_2)_n—$, $—(CH_2)_n—O—(CH_2)_m—$ or



wherein m, n and l each represent an integer of the same or different numbers within a range of 2 to 6, and

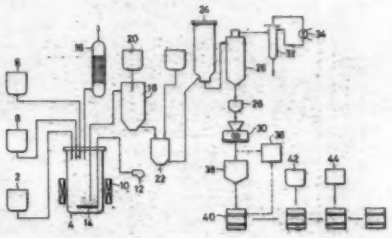
(E) the balance % by weight of a polyolefin resin the total of the quantities of (A), (B), (C), (D) and (E) being 100% by weight.

4,710,318

METHOD OF PROCESSING RADIOACTIVE WASTE

Susumu Horiuchi, and Shin Tamata, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 500,827, Jun. 3, 1983, abandoned. This application Jul. 31, 1985, Ser. No. 761,334
Claims priority, application Japan, Jun. 4, 1982, 57-96585
Int. Cl.[4] G21F *9/16*
U.S. Cl. 252—628 **17 Claims**



1. A method of processing radioactive organic waste occurring in a nuclear power plant for storage, comprising:

reducing the volume of said radioactive organic waste, wherein said radioactive organic waste includes at least one of a spent ion exchange resin and spent filter assistant by converting said radioactive organic waste to inorganic waste by way of an oxidation decomposition process with liquid hydrogen peroxide, said at least one of said spent ion exchange resin and said spent filter assistant being decomposed into water and carbon dioxide by way of the oxidation decomposition process with said hydrogen peroxide liquid to leave a residue of inorganic waste;

neutralizing the residue of the inorganic waste with an alkali substance;

pulverizing the residue of the inorganic waste; and

packing the pulverized inorganic waste in a container with an inorganic hardening agent to solidify the resulting mixtures therein.

7. A method of processing radioactive organic waste in a slurry occurring in a nuclear power plant for storage, comprising:

reducing the volume of said radioactive organic waste, wherein said radioactive organic waste includes at least one of a spent ion exchange resin and spent filter assistant by converting said radioactive organic waste to inorganic waste by way of an oxidation decomposition process with hydrogen peroxide liquid in the presence of one of ferric ions and chromate ions, so that said at least one of said spent ion exchange resin and said spent filter assistant is decomposed into water and carbon dioxide by way of the oxidation decomposition process with the hydrogen peroxide liquid to leave a residue of inorganic waste;

neutralizing the residue of inorganic waste with an alkali substance;

heating the neutralized residue of inorganic waste to concentrate the same;

pulverizing the neutralized and concentrated residue of inorganic waste; and

pelletizing the pulverized residue of inorganic waste.

4,710,319

AUTOFLUOROGRAM COMPOSITION

Duk-Hi Lee, Wellesley; Susan E. Feierberg, Belmont, and Patricia Mayer, Burlington, all of Mass., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 8, 1985, Ser. No. 796,068
Int. Cl.[4] C09K *11/04, 11/06*; G21H *5/02*
U.S. Cl. 252—646 **3 Claims**

1. An autofluorography composition comprising:

(i) a first aqueous solution of a water soluble fluor having a formula selected from R—CO_2X; R—SO_3X; and R—$^+NH_3Y^-$; where R is a fluor molecule, X is a cation and Y is an anion, which with their respective R counterions are ionized in water to impart water solubility; and

(ii) a second aqueous solution of a precipitator reagent capable of reacting with R in (i) to precipitate on insoluble fluor or an insoluble fluor salt in and to impregnate an electrophoresis gel matrix which when

(a) the water soluble fluor is R—CO_2X or R—SO_3X the precipitator reagent is selected from MgZ_2, CaZ_2, BaZ_2, CdZ_2, NH_4Z_2, NaZ, ZnZ_2 (where Z is Cl or OAc); poly(ethyleneimine); N-[4-(2,5-diphenyloxazolyl)-methyl]-ammonium chloride; N-(1-naphthylmethyl) trimethylammonium chloride; and N-[4-(2,5-diphenyl-oxazolyl)methyl]-trimethyl ammonium chloride; and

(b) the water soluble fluor is R—$^+NH_3Y^-$ the precipitator reagent is selected from R^1—CO_2X and R^1—SO_3X where R^1 is a fluor or sodium dodecyl sulfate.

4,710,320

METHOD FOR PRODUCING 1-AMINO-2-PHENOXY-4-HYDROXYANTHRAQUINONES

Makoto Hattori, Toyonaka; Masao Nishikuri, Hirakata, and Yasuyoshi Ueda, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jul. 11, 1985, Ser. No. 753,860

Claims priority, application Japan, Jul. 19, 1984, 59-150868

Int. Cl.[4] C07C *97/26*

U.S. Cl. 260—378 **11 Claims**

1. A method for producing a 1-amino-2-unsubstituted or substituted phenoxy-4-hydroxyanthraquinone, which comprises carrying out a reaction between a 1-amino-2-halogeno-4-hydroxyanthraquinone and a phenol compound at a temperature of 50° C. or higher in a sulfolane in the presence of an acid binding agent and in the presence or absence of a quaternary compound.

4,710,321

QUATERNARY AMMONIUM SALTS OF SULFONATED TRIARYLPHOSPHINES AND PROCESS FOR THE PRODUCTION THEREOF

Helmut Bahrmann, Hamminkeln; Boy Cornils, Dinslaken; Wolfgang Lipps, Oberhausen; Peter Lappe, Oberhausen, and Helmut Springer, Oberhausen, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Fed. Rep. of Germany

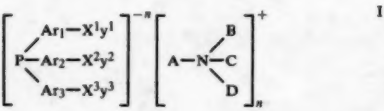
Division of Ser. No. 738,868, May 29, 1985, Pat. No. 4,673,535. This application Mar. 5, 1987, Ser. No. 22,274

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420493

Int. Cl.[4] C07C *87/30*

U.S. Cl. 200—501.15 **20 Claims**

1. A process for the preparation of a quaternary ammonium salt of a mono, di, or trisulfonated triarylphosphine, said salt being of formula I



I

wherein Ar_1-Ar_3 are each phenyl; X^1-X^3 are each independently a sulfo group; y^1-y^3 are each independently 0 or 1, provided that the sum of said y^1, y^2 and y^3 is at least 1; A is benzyl or alkyl of 12 to 18 carbon atoms; B, C and D are each independently straight chain or branched alkyl having 1–4 carbon atoms, and n is 1, 2 or 3, said process comprising

(c) sulfonating a triarylphosphine of formula II

II

wherein Ar_1-Ar_3 are each independently phenyl with oleum to form a first reaction product;

(d) mixing said first reaction product with water to form an aqueous mixture;

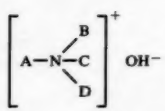
(e) adding a solution of a water insoluble amine to said aqueous mixture, resulting in a first aqueous phase and a first organic phase;

(f) intensively mixing said aqueous and organic phases;

(g) partitioning the result in step f into a second aqueous phase and a second organic phase;

(h) separating said second organic phase and said second aqueous phase from one another; and

(i) mixing said second organic phase with an aqueous solution of a quaternary ammonium hydroxide of formula III



III

wherein A, and B, C and D have the above definitions to result in said salt of said formula I.

4,710,322

PROCESS FOR THE PREPARATION OF ALKALI METAL AND ALKALINE EARTH SALTS OF BENZALDEHYDE-2,4-DI-SULFONIC ACID

Hans J. Metz, Heppenheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 776,003, Sep. 13, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 21,622

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434079

Int. Cl.[4] C07C *143/38*

U.S. Cl. 260—511 **16 Claims**

1. A process for the preparation of an alkali metal or alkaline earth metal salt of benzaldehyde-2,4-disulfonic acid, comprising the steps of:

reacting 2,4-dichlorobenzaldehyde with an alkali metal or alkaline earth metal sulfite or an alkali metal or alkaline earth metal hydrogensulfite, or mixtures of any of these salts, in a reaction medium containing water, wherein the reaction temperature is in the range of 140° C. to below 180° C. and the reaction time is less than 7 hours.

4,710,323

NITRODIARYL SULFOXIDE DERIVATIVES, PROCESS FOR THEIR PREPARATION AND PHARMACEUTICAL AND PESTICIDAL COMPOSITIONS CONTAINING THEM AS ACTIVE INGREDIENT

Janos Kreidl; Peter Turcsanyi; Zsuzsanna Aracs; Bela Stefko; Judit Meszaros; Ida Deutsch; Jeno Szilbereky; Eva Csizer; Szilard Vezer; Erik Bogsch, all of Budapest; Jozsef Bakos, Veszprem; Laszlo Szotyori, Veszprem, and Balint Heil, Veszprem, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt, Budapest, Hungary

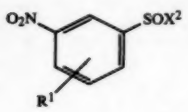
Continuation-in-part of Ser. No. 706,704, Feb. 28, 1985, and a continuation-in-part of Ser. No. 706,705, Feb. 28, 1985, and a continuation-in-part of Ser. No. 706,707, Feb. 28, 1985. This application Feb. 26, 1986, Ser. No. 833,834

Claims priority, application Hungary, Feb. 29, 1984, 813/84; Feb. 29, 1984, 814/84; Feb. 29, 1984, 815/84

Int. Cl.[4] C07C *145/00*

U.S. Cl. 260—543 R 1 Claim

1. A compound of formula (V),



(V)

wherein

R^1 is halogen or alkoxy having from 1 to 6 carbon atoms,

X^2 is halogen.

4,710,324

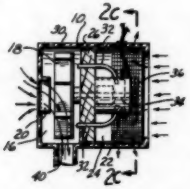
WATER AERATING DEVICE

Galdino Vesnaver, 5690 San Jacinto, Atascadero, Calif. 93422

Filed Nov. 28, 1986, Ser. No. 935,832

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—30 1 Claim



1. In combination, a tank for containing fish or other aquatic animals, and a device for aerating the water therein comprising:

a fan within a pumping chamber for drawing air through an area of the pumping chamber defining an intake port and forcing air out an area of the pumping chamber defining an exhaust port;

a fan enabling means located outside of the pumping chamber for moving the fan so that air is drawn through the area of the pumping chamber defining the intake port and is forced out the area of the pumping chamber defining the exhaust port;

a means for insulating the pumping chamber from the heat created by the fan enabling means; and,

a means for dispersing the air flowing out the exhaust port and communication with said tank.

4,710,325

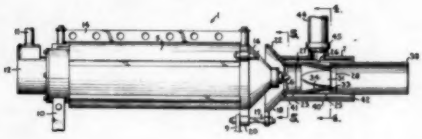
ASPIRATING AERATION AND LIQUID MIXING APPARATUS

Barry G. Cramer, and Roy A. Cramer, both of Kansas City, Mo., assignors to Air-O-Lator Corporation, Kansas City, Mo.

Filed Jan. 20, 1987, Ser. No. 4,916

Int. Cl.[4] B01F *5/02*

U.S. Cl. 261—24 6 Claims



1. An aspirating aeration and liquid mixing apparatus comprising:

(a) pump means generating a high rate, directed flow of liquid,

(b) an elongate conduit means mounted in the flow path of said liquid;

(c) an airflow plenum sealed about at least a portion of said conduit means;

(d) an air intake pipe communicating with said plenum;

(e) a nozzle portion constriction in said conduit means and having a plurality of passages through a nozzle portion sidewall and communicating with said plenum; and

(f) ramps extending over said passages in convergence to form said constriction, and said ramps having downstream facing openings and providing a low pressure area for drawing air from said plenum and through said intake pipe, said ramps and passages being spaced in an array including channels between said ramps for passage of large sized waste materials.

4,710,326

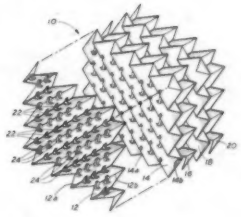
CORRUGATED PACKING AND METHODS OF USE

Alexander M. Seah, 5800 Leedale, Houston, Tex. 77016

Filed Aug. 29, 1986, Ser. No. 902,189

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—112 49 Claims



1. A packing system for use in an exchange chamber wherein two fluids may interact, comprising:

a. a plurality of corrugated plates positioned mutually parallel, with the corrugations of each of said plates forming a non-parallel relationship with the corrugations of the next corrugated plate; and

b. at least one of said plates comprising at least one slot and corresponding tab connected to the plate at the ends of the slot, straddling a corrugation ridge with the tab extending from the slot and within the groove side of the corrugation.

4,710,327
METHOD OF MOLDING AN EYE COLOR CHANGE CONTACT LENS BLANK

Charles W. Neefe, 811 Scurry St., P.O. Box 429, Big Spring, Tex. 79720

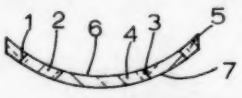
Continuation-in-part of Ser. No. 832,381, Feb. 24, 1986, abandoned. This application Jun. 27, 1986, Ser. No. 879,296
The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.
Int. Cl.[4] B29D *11/00*
U.S. Cl. 264—1.7 **6 Claims**

1. A method of molding a cosmetic contact lens blank from which a cosmetic contact lens is made by the steps of providing a cylinder shaped mold having a centrally located convex cone at the bottom of the cylinder, filling the mold with a colored liquid lens monomer, polymerizing the colored liquid lens monomer to form a colored cylinder shaped polymer body having a concave centrally located cone at one end of the cylinder, filling the concave centrally located cone with a transparent liquid lens monomer, polymerizing the transparent liquid lens monomer, cutting a peripheral convex cone on the opposite end of the cylinder from the centrally located concave cone, filling the peripheral convex cone with a clear transparent liquid lens monomer, polymerizing the clear transparent liquid lens monomer, to form a cosmetic contact lens blank, cutting a concave lens curvature that intersects the clear transparent peripheral convex cone and the colored cylinder shaped body and the transparent centrally located cone, providing a larger lens pupil and iris area by cutting the concave contact lens curve deeper into the cosmetic contact lens blank, cutting a convex contact lens curve intersecting the transparent centrally located cone to form the cosmetic lens pupil area and intersecting the colored cylinder shaped polymer body to form the cosmetic lens iris area, and intersecting the clear transparent peripheral cone to form the clear peripheral lens area.

4,710,328
METHOD OF MAKING AN EYE COLOR CHANGE CONTACT LENS

Charles W. Neefe, 811 Scurry St., Big Spring, Tex. 79720

Continuation-in-part of Ser. No. 832,381, Feb. 24, 1986, abandoned. This application Jun. 20, 1986, Ser. No. 876,790
The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.
Int. Cl.[4] B29D *11/00*
U.S. Cl. 264—1.7 **7 Claims**

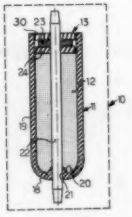


1. A method of making a cosmetic contact lens that changes the apparent color of the eye by the steps of providing a colored daylight fluorescent polymer having a central concave cone shaped depression, and a peripheral convex cone shape, filling the cone shaped central depression with a colored transparent monomer, polymerising the monomer to form a colored transparent polymer, filling the peripheral convex cone shaped area with a clear transparent monomer, polymerizing the monomer to form a clear transparent polymer, to form the cosmetic contact lens blank, cutting a concave lens surface that intersects, (1) the central cone shaped colored transparent polymer to form the pupil area and intersects, (2) the colored daylight fluorescent polymer to form the lens iris area, and intersects (3) the clear peripheral cone area to form a clear transparent peripheral lens area, cutting a convex lens surface to provide a cosmetic contact lens having a transparent colored pupil lens area, a daylight fluorescent iris lens area and a clear transparent peripheral lens area.

4,710,329
METHOD OF MANUFACTURING ARTICLES OF COMPACTED POWDER

Jean-Marie Lebas, Rueil-Malmaison; Pierre Rat, Massy; Jean-Marcel Dupont, and Germain Vinuesa, both of Angouleme, all of France, assignors to Basset Bretagne Loire - B.B.L. and Societe Nationale des Poudres et Explosifs, both of, France

Continuation of Ser. No. 314,052, Oct. 23, 1981, abandoned, which is a division of Ser. No. 72,584, Sep. 5, 1979, Pat. No. 4,330,251. This application May 16, 1984, Ser. No. 610,696
Claims priority, application France, Sep. 12, 1978, 78 26140
Int. Cl.[4] C06B *21/00*
U.S. Cl. 264—3.1 **7 Claims**



1. A method of manufacturing articles of compacted propellant powder for arms ammunition of substantially uniform density and substantially straight cylindrical shape with minimum bend,

comprising the successive steps of

providing at least one hollow mold made from flexible or resilient material having an approximately cylindrical tubular side wall of substantially constant wall thickness and a bottom wall integral with said side wall at one end thereof, and a removable plug insertable into an opposite open end of said mold for closing the same in sealing relationship, said side wall being lengthwise curved radially outwardly all around through a thickness thereof to a barrel-like shape over one longitudinal portion intermediate of the ends thereof in a normal condition of the mold;

providing a pressure chamber adapted to be filled with a substantially incompressible fluid and to accommodate at least one mold therein;

providing nitrocellulose-based powder grains, and impregnating the grains with a small predetermined amount of a suitable gelatinizing plasticizer which is liquid at a temperature lower than or equal to about 80° C. for bonding said grains together;

filling the mold with an amount of powder appropriate to form a unit charge to cause the same to assume, in its confined condition, a substantially barrel-shaped configuration with an intermediate bulge;

tightly closing the mold with said removable plug;

placing the mold into said pressure chamber filled with said substantially incompressible fluid;

heating said mold and its contents to a temperature of about 80° C. and then

building up an adequate pressure within said chamber to

subject said mold and its powder contents to an isostatic compression for a pre-determined period of time to cause said side wall to be deformed to a substantially perfect cylindrical shape;

restoring normal pressure within said chamber; and

removing said mold from said chamber and then cooling said mold and its contents and withdrawing the compacted powder article thus obtained from said mold.

4,710,330

APPLICATION OF THE LASER JET METHOD FOR INSCRIBING OFFICE MACHINE KEYBOARD BUTTONS

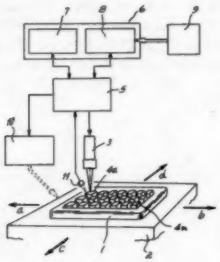
Dieter Lewandowski; Rolf Ostermoor, both of Wilhelmshaven, and Dieter Spranger, Schortens, all of Fed. Rep. of Germany, assignors to Olympia Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 820,693

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502678

Int. Cl.[4] B29C *71/04, 35/08*

U.S. Cl. 264—25 **7 Claims**



1. The method of producing an inscription on key buttons, said key buttons consisting of plastic material which changes color under the effect of energy radiation, said key buttons being mounted on a keyboard, said keyboard being adapted to be installed as a unit in a completely assembled office machine, said method comprising the steps of moving said keyboard relative to an energy radiation supply to bring each blank key button successively into the effective area of the energy radiation, storing in a memory of a control unit for controlling the deflection of the energy radiation control data for all characters and symbols to be inscribed on the blank key buttons, and upon the keyboard reaching each new inscription position deflecting the energy radiation supply so that the character or symbol coordinated with this position is inscribed on one of said key buttons by the energy radiation in accordance with the respective control data retrieved from the said memory.

4,710,331

PROCESS FOR THE PRODUCTION OF POLYTETRAFLUOROETHYLENE POROUS MEMBRANES

Kawahigashi Nobuo; Hashida Shigesou, and Kojima Yasunobu, all of Kanagawa, Japan, assignors to Nippon Valqua Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 15, 1986, Ser. No. 863,994

Claims priority, application Japan, Jun. 21, 1985, 60-135664

Int. Cl.[4] B29C *55/04, 55/12, 67/20*

U.S. Cl. 264—41 **6 Claims**

1. A process for the production of polytetrafluoroethylene porous membranes, which comprises preparing a polytetrafluoroethylene preform by compression molding a polytetrafluoroethylene resin molding powder having an average particle diameter of 1–900 μm obtained by suspension polymerization of tetrafluoroethylene, heating the preform at a temperature above 327° C. followed by skiving the heated preform into a film form, heating the obtained film at a temperature above 327° C., slowly cooling the heated film at a cooling rate of less than 70° C./hr so as to adjust the crystallinity of polytetrafluoroethylene in the heated film to 60–75%, and stretching the heated film either uniaxially or biaxially to 1.3 to 6.5 times while heating at a temperature of 100°–320° C.

4,710,332

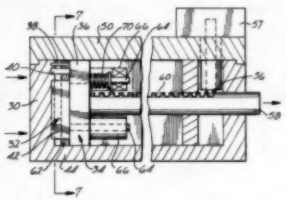
PROCESS OF INJECTION MOLDING A LASER MIRROR SUBSTRATE

Irwin E. Rosman, Woodland Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 15, 1982, Ser. No. 368,542

Int. Cl.[4] B29C *45/16;* **B32B** *18/00, 31/00*

U.S. Cl. 264—60 **7 Claims**



1. A sequential process for forming a molded article from molded plates formed in sequence in serial abutment with each other in a mold, said mold having a cavity therein defined by walls the back wall being movable and one or more of the other walls bearing injector openings, dies for forming passages within and extending therethrough said plates, said dies projecting from said movable wall toward one of the non-movable walls, said process comprising the steps of:

(1) injecting a mixture of inorganic particles and a resin binder into said cavity between the die-bearing movable wall and said non-movable wall and molding a plate therefrom having passages extending therethrough formed by said dies;

(2) moving said movable wall away from said molded plate to form another cavity in said mold adjacent to said molded plate;

(3) injecting a second mixture of inorganic particles and resin binder into the cavity formed in step 2 to mold another plate; and

(4) repeating steps 2 and 3 at least once to form a stack of abutting, molded plates which comprise a molded article containing passages therein formed by said dies.

6. A sequential process for forming a molded article from molded plates formed in sequence in serial abutment with each other in a mold, said mold having a cavity therein defined by walls the back wall being movable and one or more of the other walls bearing injector openings, dies for forming passages within said plates projecting from said movable wall toward one of the non-movable walls, said process comprising the steps of:

(1) injecting a first mixture of inorganic particles and a resin binder into said cavity between the die-bearing movable wall and said non-movable wall and molding a plate therefrom having passages formed by said dies;

(2) moving said passage forming dies out of said plate;

(3) injecting the passages formed in said molded plate with a resin, said resin filling the passages;

(4) moving said movable wall away from said molded plate to form another cavity in said mold adjacent to said molded plate;

(5) injecting another mixture of inorganic particles and resin binder into the cavity formed in step 4 to mold another plate;

(6) moving said passage forming dies out of said plate;

(7) injecting the passages formed in said plate molded in step

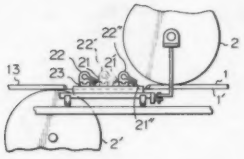
5, with a resin, said resin filling the passages formed in said plate; and

(8) repeating steps 4, 5, 6 and 7 as many times as desired to form a stack of abutting, molded plates which comprise a molded article containing passages therein formed by said dies.

4,710,333
PROCESS FOR CONTINUOUS PREPARATION OF SYNTHETIC RESIN PLATES HAVING IRREGULAR FLOW PATTERN OF DIFFERENT COLORS

Saburo Murakami; Shoji Kinashi, and Toyokazu Ego, all of Toyama, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1985, Ser. No. 793,639
Claims priority, application Japan, May 24, 1985, 60-110117
Int. Cl.[4] B29C *39/20*
U.S. Cl. 264—73 **5 Claims**



1. A process for the continuous preparation of synthetic resin plates having an irregular flow pattern of different colors by continuously polymerizing polymerizable materials in a polymerization zone defined by confronting surfaces of two confronting and running endless belts and gaskets held between the confronting surfaces of the belts, wherein polymerizable materials of different colors are supplied in the polymerizable material supply region close to the upstream end of the polymerization zone by a plurality of supply means, each supply means including at least one polymerizable material supply opening to the polymerizable material supply region and said supply means being arranged in such a manner that they are spaced from one another in the direction of travel of the belts;

the colored polymerizable materials are supplied into the polymerizable material supply region from the respective supply means while the supply opening of the supply means arranged on the upstream end in the width direction of the belts is reciprocated; the supply opening of the supply means arranged on the downstream end is kept stationary or reciprocated in the width direction of the belts at an amplitude smaller than the amplitude of the reciprocative movement of the supply opening of the supply means arranged on the upstream end; and

the colors of the colored polymerizable materials supplied from at least two of the supply means are made different from each other or the colored polymerizable material supplied from at least one of the supply means is formed into a laminar flow composed of a plurality of polymerizable materials differing in the color.

4,710,334
METHOD OF PREPARING A TEMPLATE

James J. Rossetti, Palmyra, Wis., assignor to Advanced Tool Technology, Inc., Lake Geneva, Wis.

Filed May 1, 1986, Ser. No. 858,205
Int. Cl.[4] B29C *33/40, 39/42*
U.S. Cl. 264—102 **20 Claims**

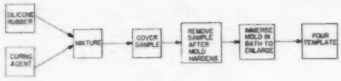
1. A method of preparing a template for a product from a sample of the product, comprising the steps of

a. preparing a mixture of liquid rubber and a curing agent,

b. covering the sample with the mixture,

c. permitting the mixture to harden about the sample to form a mold,

d. removing the sample from the mold to form a cavity in the mold,



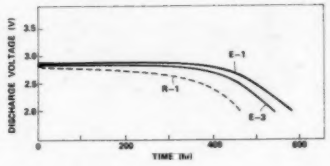
e. altering the size of the cavity of the mold, by proportionately and permanently changing the dimensions of the mold after the mixture has hardened, and

f. pouring a hardenable material into the mold to form the template.

4,710,335
METHOD OF PRODUCING ELECTRIC CELL ANODE USING POWDERY ACTIVE MATERIAL

Yasushi Kita, and Shiro Moroi, both of Ube, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jun. 12, 1985, Ser. No. 743,931
Claims priority, application Japan, Jun. 13, 1984, 59-119915
Int. Cl.[4] H01M *4/26*
U.S. Cl. 264—105 **5 Claims**



1. A method of producing an anode for use in a lithium cell, the method comprising the steps of:

preparing a dispersion of a graphite flouride in finely divided form, which is employed as an active material, and an electically conductive material in finely divided form in a solution of an organic polymer, which is employed as binder, in a first liquid;

mixing said dispersion with a second liquid in which said polymer is substantially insoluble so as to cause precipitation of said polymer in a state intimately mixted with said graphite flouride and said conductive material;

separating the mixture of said graphite flouride, said conductive material and the precipitated polymer from the mixed liquid;

drying the separated mixture; and

froming the dried mixture into an anode body of a desired shape by application of a pressure.

4,710,336
PROCESS FOR PREPARING TWO-COMPONENT SYNTHETIC FIBERS SUITED FOR REPLACING CELLULOSE FIBERS

Lino Credali, Casalecchio di Reno; Gianfranco Corsi, and Antonio Chiolle, both of Ferrara, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 692,421, Jan. 18, 1985, abandoned, which is a continuation of Ser. No. 488,816, Apr. 26, 1983, abandoned. This application Nov. 15, 1985, Ser. No. 798,400
Claims priority, application Italy, Apr. 27, 1982, 20951 A/82
Int. Cl.[4] D01D *1/02, 5/11*
U.S. Cl. 264—171 **3 Claims**

1. A process for preparing a two-component fiber having a surface area of at least 1 m^2/g consisting of a core of an olefinic

polymer and an outer sheath of a hydrophilic polymer, suited for replacing cellulose fibers in the manufacture of paper and paper-like products, comprising:

extruding a mixture, at autogenous pressure or greater, into a medium at a lower pressure, said mixture being a stable water-in-oil emulsion comprising an olefinic polymer and a solvent, and a hydrophobic polymer and a solvent, said solvents being, in part, reciprocally insoluble, said emulsion being characterized by a volume ratio of the solvent for the olefinic polymer to the solvent for the hydrophilic polymer of at least 2.5, the concentration of the hydrophilic polymer in its own solvent being at least 2 grams per liter of solvent, and the concentration of the olefinic polymer in its solution being between 20 and 200 g/l of solvent, said extruding being conducted at a temperature exceeding the boiling temperature of the solvent for the olefinic polymer, and at a temperature at least equal to the dissolution temperature of the olefinic polymer in said solvent.

4,710,337

METHOD AND APPARATUS FOR CONTINUOUSLY EXTRUDING SINGLE-WALL PIPE OF PLASTICS OR OTHER MOULDABLE MATERIAL

Erik G. W. Nordström, Kovland, Sweden, assignor to Uponor AB, Sweden

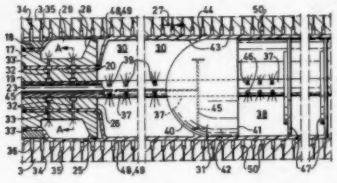
PCT No. PCT/SE84/003849, § 371 Date Jul. 8, 1985, § 102(e) Date Jul. 8, 1985, PCT Pub. No. WO85/02144, PCT Pub. Date May 23, 1985

PCT Filed Nov. 14, 1984, Ser. No. 758,666

Claims priority, application Sweden, Nov. 15, 1983, 8306284

Int. Cl.[4] B29C *47/30*

U.S. Cl. 264—508 **35 Claims**



1. In a method of manufacturing a single-wall ribbed conduit having a smooth inner surface from a thermoplastic extrudable material wherein said material is fed from at least one extruder through an extruder nozzle and into a molding apparatus comprising mould-jaw chains which move adjacent one another along a molding line and include mould-jaw parts whose mutually opposing surfaces in the molding line have a form corresponding to a desired form of an outer surface of the conduit under manufacture, and wherein said material is pressed agains the surfaces of the mould-jaw along at least a part of the molding line and wherein the mould-jaw chain are caused to move away from one another subsequent to passing the moulding line, the mould-jaw parts therewith releasing their engagement with the outer surface of the conduit under manufacture, the improvement comprising:

producing the conduit under manufacture in at least two stages by supplying said extrudable material to said moulding line to at least two separate locations, a first location and a second location positioned after the first location in the direction of conduit movement;

supplying said material to said first location from a first channel of circular cross-section and forcing such material against the mould-jaw part by a gaseous medium under pressure and/or suction-drawing such material against said mould-jaw part by a vacuum exerted through passages in said mould-jaw parts, while adjusting the quantity of material supplied and the pressure and/or vacuum at said first location so that grooves in the mould-jaw parts, corresponding to outwardly protruding portions of the conduit under manufacture, are filled with said material at least to the bottom thereof; and

supplying additional extrudable material to said second location from a second channel of circular cross-section formed between an external first mandril and an internal second mandril and discharging such additional material into a cavity located between an input end of a smoothing mandril and ends of said first and second mandrils facing said smoothing mandril, and forcing such additional material against the material delivered to said first location by a pressurized gaseous medium fed to said cavity.

16. In an apparatus for producing a single-wall ribbed conduit having a smooth inner surface from an extrudable plastics material, said apparatus comprising at least one extruder; a plurality of complementary mould-jaws having mutually facing surfaces with recesses therein corresponding to a desired form of outer surface of the conduit being produced, said mould-jaws being arranged for transportation in an endless chain along a select transport distance of said chain to define a moulding line; an extrusion nozzle coupled with said extruder for supplying moulten plastics material to said moulding line; pressure means for urging the moulten plastics material against said mutually facing surfaces of the mould-jaws along at least a part of the moulding line; cooling means for cooling the conduit being produced; separating means for moving the mould-jaws apart subsequent to passage past said moulding line, said mould-jaws being arranged to release their engagement with the outer surface of the conduit being produced; the improvement comprising:

at least two stages for supplying material to the moulding line at least at two mutually separated locations, a first location and a second location positioned after the first location in the direction of material movement along said moulding line;

adjustment means for regulating the amount of material supplied and the pressure and/or vacuum applied at said first location in a manner such that the recesses in the mould-jaws are filled with said material at least to their respective bottom portions;

supply means for providing a pressurized gaseous medium to said first and second location to press supplied material against the mould-jaws and for providing a vacuum to at least said first location to draw supplied material against the mould-jaws;

passages in said mould-jaws at the bottom of the grooves of each respective recesses connected to said vacuum supply means at least in the vicinity of said first location;

a first channel having a circular cross-section positioned to supply material to said first location, said first channel opening into an annular first space formed between an outer first mandril and the mould-jaws and coupled with said supply means for pressurized gaseous medium and vacuum; and

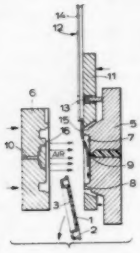
a second channel having a circular cross-section positioned to supply material to said second location, said second channel being formed between said outer said first mandril and an inner second mandril, said second channel opening into an annular second space defined, when seen in the direction of material movement, by respective end of said first and second mandrils facing a smoothing mandril located past said second channel and an input end of said smoothing mandril; and means for interconnecting said supply means for pressurized gaseous medium to said second space to provide said pressurized gaseous medium to such second space to press the material supplied at the second location against the material supplied at the first location.

4,710,338

METHOD OF MANUFACTURING A MOLDED PLASTICS ARTICLE INCORPORATING A BLANK OF SHEET

Paul J. H. Bagnall, Admaston, and Norman Whiteley, Walsall, both of England, assignors to Peerless Plastics Packaging Limited, Great Britain

Filed Nov. 10, 1986, Ser. No. 929,989
Int. Cl.[4] B29C *31/08, 45/14*
U.S. Cl. 264—509 19 Claims



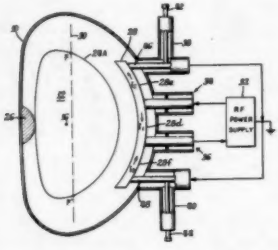
1. A method of manufacturing a moulded plastics article which incorporates a blank of sheet material smaller in size in its flat state than the area of the mould cavity where the halves of an injection mould in which the article is to be moulded meet along a vertically disposed parting plane comprising the steps of placing said blank in a vertically orientation in holder means externally of said mould cavity above one of said mould halves containing a recess of said mould cavity which is to receive said blank, causing said blank to be released by said holder means when said mould halves are open so as to fall edge-first between said mould halves and causing said blank as it falls to be entered transversly into said recess in said one mould half, closing said mould when said blank is in said recess, forcing a thermoplastics material into said mould cavity and on to said blank, and when said material has cooled to form a solidified plastics article removing said article incorporating said blank from said mould cavity.

4,710,339

ION CYCLOTRON RANGE OF FREQUENCIES HEATING OF PLASMA WITH SMALL IMPURITY PRODUCTION

Tihiro Ohkawa, La Jolla, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 27, 1984, Ser. No. 645,031
Int. Cl.[4] G21B *1/00*
U.S. Cl. 376—123 4 Claims



1. In a plasma device having plasma including plasma ions magnetically confined by a magnetic field, wherein the plasma has a defined outer surface and is intersected by resonance surfaces of respective common ion cyclotron frequency of a predetermined species of plasma ions moving in said magnetic field, an apparatus for ion cyclotron range of frequencies heating of said plasma comprising

radio frequency source means for providing radio frequency power at a radio frequency corresponding to the ion cyclotron frequency of said predetermined species of plasma ions moving in said field at a respective said resonance surface, and

launching means coupled to said radio frequency source means for radiating radio frequency energy at said radio frequency onto said respective said resonance surface within said plama simultaneously from a plurality of locations located outside said plasma at such respective distances from the intersections of said respective resonance surface and said defined outer surface and at such relative phases that the resulting interference pattern provides substantially null net radio frequency energy over regions near and including substantial portions of said intersections relative to the radio frequency energy provided thereby at other portions of said respective resonance surface within said plasma.

3. A method for ion cyclotron range of frequencies heating of plasma including plasma ions magnetically confined by a magnetic field, wherein the plasma has a defined outer surface and is intersected by resonance surfaces of respective common ion cyclotron frequency of a predetermined species of plasma ions moving in said magnetic field, said method comprising

providing radio frequency energy at a radio frequency corresponding to the ion cyclotron frequency of said predetermined species of plasma ions moving in said field at a respective said resonance surface, and

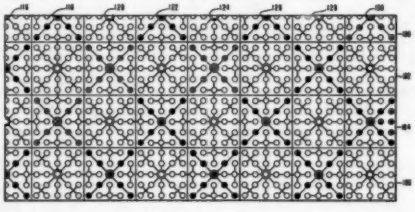
radiating said radio frequency energy at said radio frequency onto said respective said resonance surface within said plasma simultaneously from a plurality of locations located outside said plasma at such respective distances from the intersections of said respective resonance surface and said defined outer surface and at such relative phases that the resulting interference pattern provides substantially null net radio frequency energy over regions near and including substantial portions of said intersections relative to the radio frequency energy provided thereby at other portions of said respective resonance surface within said plasma.

4,710,340

MECHANICAL SPECTRAL SHIFT REACTOR

Walter J. Dollard, Penn Hills; Pratap K. Doshi, Murrysville, and Raymond A. George, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 565,513, Dec. 27, 1983, abandoned, which is a continuation of Ser. No. 217,060, Dec. 16, 1980, abandoned. This application Sep. 24, 1986, Ser. No. 910,840
Int. Cl.[4] G21C *7/26*
U.S. Cl. 376—209 16 Claims



1. The method of operating pressurized-water nuclear reactor fueled by material having both fissile and fertile constituents in such manner that the neutron spectrum is hardened at the beginning of normal reactor operation and during prolonged reactor operation which results in the gradual depletion of reactor fuel, the neutron spectrum is gradually shifted toward a more moderated state to compensate for the depleted

fuel, said reactor including a pressure vessel enclosing a reactor core and having an inlet and an outlet for circulating a water coolant moderator in heat transfer relationship with said core, said core comprising a plurality of fuel assemblies disposed therein for generating heat by nuclear fission, said fuel assemblies having a fuel enrichment which provides a measure of excess reactivity at the beginning of core life which is later drawn upon to lengthen core life, said reactor provided with a plurality of neutron-absorbing control rods which are vertically movable into and out of said core so that movement of said control rods into said core will substantially decrease reactivity and withdrawal of said control rods from said core will substantially increase reactivity, said control rods when inserted into said core displacing an equivalent volume of said water coolant moderator, said reactor also provided with a plurality of neutron-spectral-shift displacer rods which have a substantially lower absorptivity for neutrons than said control rods, each said neutron-spectral-shift displacer rod comprising a hollow thin-walled Zircaloy member containing a filling of solid or annular zirconium- or aluminum-containing material for providing internal support and mass for said thin-walled tubular member, each said displacer rod having overall neutron-absorbing and -moderating characteristics essentially not exceeding those of hollow tubular Zircaloy members with or without a filling of zirconium oxide pellets or aluminum oxide pellets, said neutron-spectral-shift displacer rods when fully inserted into said core displacing an equivalent volume of said water coolant moderator to decrease reactivity, said neutron-spectral-shift displacer rods being vertically movable into and out of said reactor core with the spectral-shift-rod movement being independent of the movement of said control rods, the volume of said water coolant moderator which is displaced by all said neutron-spectral-shift displacer rods when fully inserted into said core very substantially exceeding the volume of said water coolant moderator which is displaced by said control rods if fully inserted into said core, and the decrease in reactivity resulting from the full insertion into said core of all of said neutron-spectral-shift displacer rods being less than said measure of excess reactivity, said method comprising:

at least partially compensating for said measure of excess reactivity at the beginning of core life by fully inserting said neutron-spectral-shift displacer rods into said core and separately controlling reactor operation by using neutron absorption, with the displacement of said water coolant moderator by said neutron-spectral-shift displacer rods resulting in a hardened neutron spectrum which functions to convert fertile material constituents of said fuel to fissionable material;

as said reactor continues to operate with the attendant gradual depletion of fuel, withdrawing portions of said neutron-spectral-shift displacer rods from said core so that the water coolant moderator which replaces said withdrawn neutron-spectral-shift rods operates to shift the neutron spectrum from a hardened state to increase the reactivity of said reactor fuel to offset the effects of fuel depletion; and

continuing to withdraw said neutron-spectral-shift displacer rods from said core during prolonged reactor operation to offset the gradual fuel depletion until near the end of reactor core life when all of said neutron-spectral-shift displacer rods have been fully withdrawn from said core; whereby the additional fissionable material converted from fertile material by the hardened neutron spectrum contributes heat to reactor operation.

4,710,341

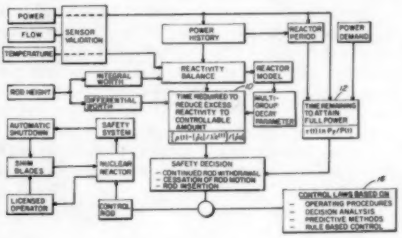
APPARATUS AND METHOD FOR CLOSED-LOOP CONTROL OF REACTOR POWER

John A. Bernard, Needham Heights; Allan F. Henry, Boston, both of Mass.; David D. Lanning, Hampstead, N.H., and Kwan S. Kwok, Newtonville, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 633,939, Jul. 24, 1984, Pat. No. 4,637,911. This application Sep. 12, 1986, Ser. No. 907,048

Int. Cl.[4] G21C *7/36*

U.S. Cl. 376—216 **20 Claims**



1. Apparatus for closed-loop control of reactor power in a nuclear reactor in which power level is altered by adjustments in reactivity balance comprising:

means for adjusting said reactivity balance; and

computing apparatus for computing repeatedly at intervals the two functions $[\rho(t)-|\rho_c|/\lambda_e'(t)]/|\rho_c|$ and $\tau(t)\ln(P_F/P(t))$; whereby net reactivity is limited by adjusting said reactivity balance when the two functions become equal.

4,710,342

STRUCTURE ASSEMBLABLE AND DISASSEMBLABLE ON A RACKING SITE FOR THE STORAGE OF NUCLEAR REACTOR FUEL ELEMENTS

Louis J. Helary, Nantes, and Pierre Grenon, Treillieres, both of France, assignors to Et.Lemer & Cie., Cedex, France

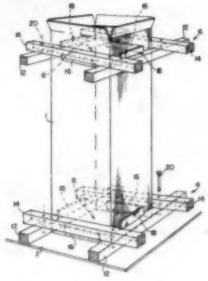
PCT No. PCT/FR84/00232, § 371 Date Jun. 19, 1985, § 102(e) Date Jun. 19, 1985, PCT Pub. No. WO85/01827, PCT Pub. Date Apr. 25, 1985

PCT Filed Oct. 17, 1984, Ser. No. 751,776

Claims priority, application France, Oct. 19, 1983, 83 16847

Int. Cl.[4] G21C *19/40, 19/06*

U.S. Cl. 376—272 **1 Claim**



1. An assemblable and disassemblable nuclear fuel element storage rack structure comprising

(a) a juxtapositioning of vertically arranged parallelepipedic racks, said racks being open at their ends and having two pairs of respectively parallel faces;

(b) a horizontal base plate;

(c) at least two meshed networks of horizontal bars, each said network comprising a first series of parallel bars and a second series of parallel bars which are crossed with the bars of said first series, thereby defining openings, each of said openings receiving one said rack, a first of said networks, called lower network, being fixed to said base plate, and a second of said networks being located at an upper part of said racks;

(d) dismantlable fixing means connecting, in each of said networks, the bars of said first series to the bars of said second series, and in said lower network, the bars of each series of bars to said base plate;

(e) at least two horizontal strips fixed to two different faces of each said rack, substantially at level of each said network, a first of said strips being located in contact with and above one bar of said first series and a second of said strips being located in contact with and below one bar of said second series, whereby said racks are locked with respect to said networks of bars; and

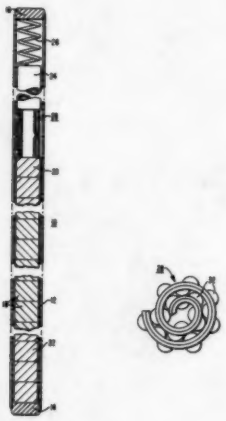
(f) means securing said racks located on the periphery of said rack structure against the bars located at the ends of each said series.

4,710,343

NUCLEAR BREEDER REACTOR FUEL ELEMENT WITH SILICON CARBIDE GETTER

David W. Christiansen, Kennewick, and Richard A. Karnesky, Richland, both of Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 27, 1985, Ser. No. 802,559
Int. Cl.[4] G21C *3/20*
U.S. Cl. 376—414 **2 Claims**



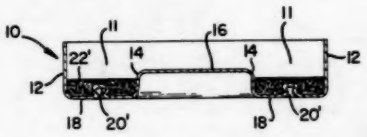
1. A breeder reactor fuel element including a tubular cladding hermetically sealed at each end by an end plug, one interior portion of the cladding defining a fuel space filled with a column of fissile material comprising a mixture of PO_2 and UO_2, and an upper and lower fertile material blanket comprising UO_2 arranged axially in tandem with the fissile column within the cladding, wherein the improvement comprises a cesium getter disposed at least at the upper end of said upper blanket, said getter including a helical rolled substrate of stainless steel coated with silicon carbide material for collecting and isolating cesium migrating thereto and said stainless steel substrate having dimples formed therein for holding apart successive convolutions of said rolled substrate to permit a volume expansion of said getter.

4,710,344

METHOD OF FORMING A GETTER ASSEMBLY

Thomas H. Ward, Bay Village; Phillip A. Costanzo, Parma; Vincent Pietrasz, Cleveland, and Edmund J. Soeder, Parma Hts., all of Ohio, assignors to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 539,795, Oct. 7, 1983, Pat. No. 4,642,516.
This application Dec. 22, 1986, Ser. No. 944,581
Int. Cl.[4] B22F *7/04*
U.S. Cl. 419—8 **1 Claim**



1. A method of forming a getter assembly comprising:

providing a metal annular channel defined by outer and inner sidewalls and a bottom connecting said outer and inner walls, said bottom wall having an integrally formed annular groove having the general shape of half a sine period extending upwardly into said channel;

providing getter material into said annular channel to cover said annular groove; and

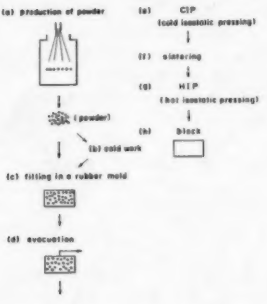
pressing said getter material to deform said annular groove into a generally bulb-shaped cross section which narrows down adjacent said bottom wall, said annular groove thereby interlocking with the pressed getter material.

4,710,345

MANUFACTURING METHOD OF SUPER-HEAT-RESISTING ALLOY MATERIAL

Yoshihiko Doi; Nobuhito Kuroishi; Shigeki Ochi, and Noboru Uenishi, all of Itami, Japan, assignors to Japan as represented by Director-General, Agency of Industrial Science & Technology, Tokyo, Japan

PCT No. PCT/JP85/00595, § 371 Date Apr. 22, 1986, § 102(e) Date Apr. 22, 1986, PCT Pub. No. WO86/02669, PCT Pub. Date May 9, 1986
PCT Filed Oct. 26, 1985, Ser. No. 852,966
Claims priority, application Japan, Oct. 26, 1984, 59-224094; Oct. 26, 1984, 59-224095
Int. Cl.[4] B22F *3/24*
U.S. Cl. 419—28 **4 Claims**



1. A method of manufacturing a super-heat-resisting alloy material comprising the steps:

cold working a powder of Ni-based super-heat-resisting alloy;

filling and sealing the powder in a rubber mold;

isostatically cold pressing the powder in the rubber mold into compacted powder;

sintering the compacted powder in a vacuum or in a gas atmosphere at a temperature of 1000° C. or more so that the density of the resulting sintered compact material increase up to 95% or more of the theoretical density; and

isostatically hot pressing the sintered compact material.

4,710,346
METHOD FOR MANUFACTURING POWDER MATERIAL AND SHAPED PRODUCTS UTILIZING THE CONDITIONS IN OUTER SPACE

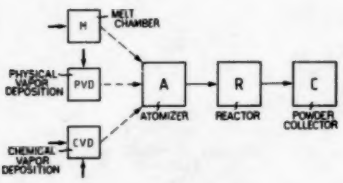
Axel Rossman, Karlsfeld, Fed. Rep. of Germany, assignor to Motoren-und Turbinen-Union München, GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 9, 1985, Ser. No. 689,839

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1984, 3401700

Int. Cl.⁴ B22F *33/02*

U.S. Cl. 419—68 **16 Claims**



1. A method for manufacturing powders comprising converting a solid starting material from the solid state to the gaseous or vapor phase, and forming powder particles by introducing the starting material in gaseous or vapor phase through an inlet into a sealed chamber and subjecting said chamber and the material therein to substantially zero gravity such that the crystal nuclei of the starting material become formed into the powder particles in flotation condition in said chamber, expanding or contracting said sealed chamber while the material is subjected to zero gravity and reflecting radiation into the chamber from a radiation reflecting coating in a portion of the wall of the chamber.

4,710,347
MARAGING STEEL HAVING HIGH STRENGTH AND HIGH TOUGHNESS

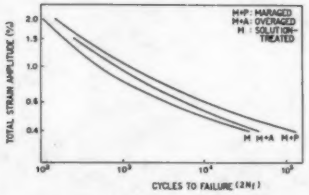
Kim Y. Gil, and Lee C. Sun, both of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea

Filed May 30, 1986, Ser. No. 868,594

Claims priority, application Rep. of Korea, Oct. 12, 1985, 7505

Int. Cl.⁴ C22C *38/44*

U.S. Cl. 420—94 **1 Claim**



1. A maraging steel having high strength and high toughness, consisting of 15% to 25% nickel, 2% to 8% tungsten, 0.5% to 2.0% titanium, 0.05% to 0.30% aluminum, and the balance iron.

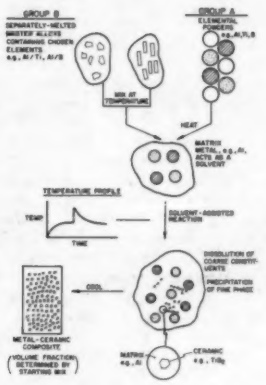
4,710,348
PROCESS FOR FORMING METAL-CERAMIC COMPOSITES

John M. Brupbacher; Leontios Christodoulou, and Dennis C. Nagle, all of Baltimore, Md., assignors to Martin Marietta Corporation, Bethesda, Md.

Continuation of Ser. No. 662,928, Oct. 19, 1984, abandoned. This application Dec. 19, 1986, Ser. No. 943,899

Int. Cl.⁴ C22C *1/00*

U.S. Cl. 420—129 **43 Claims**



1. A method for the production of metal-ceramic composite materials containing a ceramic phase, said method comprising precipitating at least one ceramic material in a metal matrix by contacting reactive ceramic forming constituents, in the presence of a non-reactive solvent matrix metal in which said ceramic forming constituents are more soluble than said ceramic phase, at a temperature at which sufficient diffusion of said constituents into said solvent matrix metal occurs to cause reaction of said reactive ceramic forming constituents raising the temperature above the melting temperature of the matrix metal to precipitate said ceramic phase in said solvent matrix metal.

4,710,349
HIGHLY CONDUCTIVE COPPER-BASED ALLOY

Shinsuke Yamazaki, Ichikawa; Rikio Takeda, Koganei, and Iwao Uda, Sakai, all of Japan, assignors to Sumitomo Metal & Mining Co., Ltd., Tokyo, Japan

Filed Mar. 5, 1987, Ser. No. 22,377

Claims priority, application Japan, Mar. 18, 1986, 61-58024

Int. Cl.⁴ C22C *9/00*

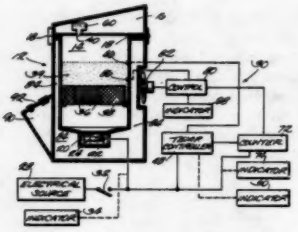
U.S. Cl. 420—495 **2 Claims**

1. A highly conductive copper-based alloy consisting essentially of, by weight, 0.001% to 0.02% of tellurium, 0.05% to 0.3% of one element selected from the group consisting of iron and chromium, and 0% to 0.01% of phosphorous with the balance being copper and incidental impurities.

4,710,350
APPARATUS AND METHOD FOR STERILIZING WITH VAPORIZABLE LIQUIDS

C. William Petersen, 295 Poplar, Elmhurst, Ill. 60126

Continuation of Ser. No. 625,319, Jun. 27, 1984, abandoned.
This application Apr. 9, 1986, Ser. No. 851,313
Int. Cl.[4] A61L *2/20*
U.S. Cl. 422—37 12 Claims



1. A sterilizing device comprising a housing having an openable access closure and defining an interior chamber having upper and lower portions,

a reservoir means in the lower portion of said chamber containing a substantially non-toxic, substantially inert, vaporizable sterilizing liquid having a boiling point sufficiently high to kill microorganisms unsafe for humans,

electrical heating means for heating and vaporizing the sterilizing liquid and providing a rising blanket of substantially saturated vapors of said sterilizing liquid,

support means located above said reservoir means supporting articles to be sterilized and permitting the rising vapors to contact and pass over the articles,

electrical control circuit means connected to a source of electrical energy and to said heating means for controlling the operation of said heating means and thereby controlling the level of the vapors in said chamber, said control circuit means including,

means located above said support means and the articles supported thereon for sensing the presence and absence of a relatively dense blanket of the vapors,

means electrically interconnecting said sensing means and said heating means for permitting the flow of electrical energy to said heating means in response to said sensing means sensing the absence of a vapor blanket and for terminating the flow of electrical energy to said heating means after a predetermined period sufficient to sterilize the articles subsequent to said sensing means sensing the presence of a vapor blanket, and

vent passage means providing an opening to the atmosphere throughout normal operation of said device for discharging to the atmosphere the air displaced from said chamber by the rising vapor blanket, said vent passage means including an inlet communicating with said chamber at a location above said sensing means and an outlet communicating with the atmosphere.

4,710,351
AUTOMATED HANDLING SYSTEM

Frank W. Wogoman, South Bend, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

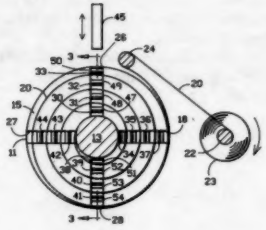
Filed Oct. 4, 1984, Ser. No. 657,940
Int. Cl.[4] B01L *11/00*; B65H *5/28*
U.S. Cl. 422—50 3 Claims

1. Storage spool apparatus for storing and dispensing multiple flexible test devices having a reagent matrix attached to substrate material, said storage spool apparatus comprising:

a storage spool having at least two wall members extending radially from a central core member, said wall members having multiple channels constructed and arranged for retaining flexible test devices parallel to said central core member;

interwinding material wound around the central core member and between two wall members for retaining flexible test devices in said multiple channels while segregating a flexible test device from a next adjacent parallel flexible test device in the same channel;

a take-up spool interconnected to said storage spool by attachment to one end of said interwinding material such that rotation of said take-up spool rotates said storage spool and sequentially exposes successive flexible test devices by removing interwinding material from over



successive flexible test devices located in said multiple channels of said storage spool;

vacuum pickup head means mounted adjacent to said storage spool;

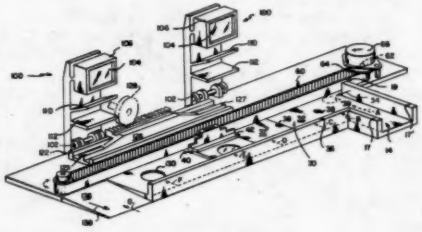
reciprocating means for moving said vacuum pickup head means into said storage spool between said wall members when said storage spool is in a stationary position to contact a flexible test device exposed by rotation of said take-up spool and removing said pickup head means from said storage spool following such contact; and

means for supplying vacuum to said vacuum pickup head means when said vacuum pickup head means is in contact with a flexible test device in said storage spool.

4,710,352
SIMPLIFIED TEST ELEMENT ADVANCING MECHANISM HAVING POSITIVE ENGAGEMENT WITH ELEMENT

Daniel A. Slater; William A. Meredith, and Mark J. Devaney, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 20, 1985, Ser. No. 777,985
Int. Cl.[4] G01N *35/00*
U.S. Cl. 422—63 9 Claims



1. A test element advancing mechanism for use in an analyzer to move a test element from station to station, the mechanism comprising

(a) a support surface over which elements are slidably advanced in a predetermined direction, said surface having first and second edges,

(b) a test element mover having a pivot axis extending parallel to said support surface, said mover including engaging means projecting therefrom for engaging test elements, said test element engaging means including two interior corners and a surface between them constructed to engage at least one edge of engaged test elements along one side of such test elements, said one test element edge being an edge that extends generally parallel to said pivot axis,

(c) means for reciprocating said mover along a surface disposed to one side of said support surface, a portion of said mover being constructed to engage said reciprocating means, and

(d) means for pivoting said mover about said axis, so that said engaging means are moved into or out of contact with test elements, said mover including a lever arm emanating from one side of said reciprocating means engaging portion and constructed to interact with said pivoting means, said reciprocating means being sufficiently flexible as to be rotatable about said pivot axis when said pivoting means is activated,

said test element engaging means of said mover emanating from a side of said reciprocating means engaging portion that is opposite to said one side,

whereby said mover engages test elements at a side edge.

4,710,353

CORROSIVE LIQUID LEAK DETECTING SENSOR

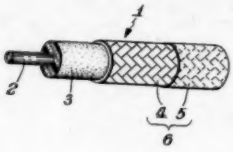
Satoshi Tanaka, Hitaka, and Haruo Imaizumi, Nishi-Asuma, both of Japan, assignors to Junkosha Co., Ltd., Japan

Filed Jul. 11, 1986, Ser. No. 884,725

Claims priority, application Japan, Jul. 19, 1985, 60-159557

Int. Cl.[4] G01N *17/00, 21/17, 21/71;* **G02B** *6/22*

U.S. Cl. 422—68 **20 Claims**



1. A device of manufacture for detecting leaks of a corrosive liquid comprising an elongated optical fiber light guide core having a covering thereover, and light-emitting means and light-receiving means connected to the light guide core, wherein said covering generates heat upon contact with a corrosive liquid to be detected thereby changing the light transmittivity of the light guide core, which change is detected by said light-receiving means, wherein said covering is a porous polymer containing within its pores a material which generates heat upon contact with the corrosive liquid to be detected and wherein the liquid to be detected is alkaline and said material which generates heat is an ammonium salt.

12. A device of manufacture for detecting leaks of a corrosive liquid comprising an elongated optical fiber light guide core having a covering thereover, and light-emitting means and light-receiving means connected to the light guide core, wherein said covering generates heat upon contact with a corrosive liquid to be detected thereby changing the light transmittivity of the light guide core, which change is detected by said light-receiving means, wherein said covering is a porous polymer containing within its pores a material which generates heat upon contact with the corrosive liquid to be detected and wherein the liquid to be detected is acid and said material which generates heat is sodium carbonate.

4,710,354

DEVICE FOR HEATING OF SOLID OR LIQUID SAMPLES IN SMALL QUANTITIES

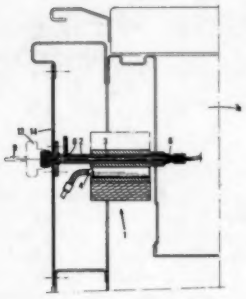
Francoise Behar, Paris; Jeannine Roucache, Le Chesnay; Jean Auger, Dourdan, and Luc Boudet, Chelles, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Jun. 18, 1985, Ser. No. 746,093

Claims priority, application France, Jun. 18, 1984, 84 09622

Int. Cl.[4] G01N *31/12*

U.S. Cl. 422—80 **9 Claims**



1. In a device useful for heating of solid or liquid samples taken in small amounts, comprising a tubular liner inside which is defined a zone for heating a sample, heating means located near said zone for heating a sample and means for measuring the temperature in said zone, a sample holder adapted to be introduced into said tubular liner as far as said heating zone, said tubular liner having an effluent outlet orifice which is connected to means enabling measuring and analysis, said device also comprising an orifice for introducing a vector gas for driving along effluents through said heating zone, said orifices being situated on each side of said heating zone, said sample holder comprising a rod which is engaged in said tubular liner and so arranged that there exists a reduced annular space between said rod and said liner for the flow of the vector gas, said rod having an elongate cavity in a side wall of the rod opening into said annular space and adapted for receiving a sample, and means for sealing and positioning said cavity in said tubular liner fitted to said rod at one end of said tubular liner.

4,710,355

REAGENT DELIVERY DEVICE

Masao Ushikubo, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jun. 11, 1985, Ser. No. 743,389

Claims priority, application Japan, Jun. 14, 1984, 59-120640; Aug. 18, 1984, 59-171001

Int. Cl.[4] B01L *3/02;* **G01N** *37/00*

U.S. Cl. 422—100 **7 Claims**

1. A reagent delivery device comprising:

a plurality of sucking and discharging means;

a plurality of like-constructed units connected to said sucking and discharging means, each unit having valves the number of which corresponds to the number of said sucking and discharging means, and driving means for simultaneously driving said valves;

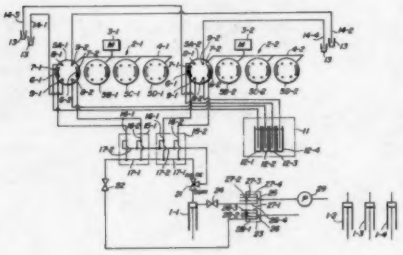
a plurality of reagent tanks connected to said valves in which a plurality of reagents are respectively contained;

a plurality of delivery nozzles connected to said valves; and

a plurality of like-constructed manifold block means connected to said sucking and discharging means and being readily attachable to and detachable from one another, said units and said sucking and discharging means, each

said manifold block means having a plurality of flow lines for connecting a corresponding sucking and discharging means to one of said valves in each respective unit;

whereby respective delivery nozzles and reagent tanks are selectively connected to said sucking and discharging means by an operation of said valves; and



further whereby the number of reagents can be increased by simply providing additional delivery nozzles and likeconstructed units, connected to said sucking and discharging means through additional like-constructed manifold block means or manifold block means having additional flow lines, without additional sucking and discharging means.

4,710,356

APPARATUS TO ACCELERATE THE TRANSFER OF MATERIAL BETWEEN TWO MEDIA REACTING IN A FLUIDIZED BED

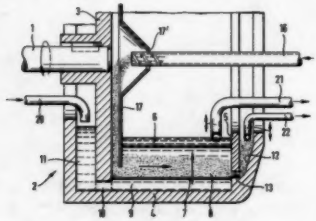
Franz Alstetter, Karlsfeld, and Guenther Hultsch, Oberschleisheim, both of Fed. Rep. of Germany, assignors to Krauss-Maffei A.G., Fed. Rep. of Germany

Filed Dec. 21, 1984, Ser. No. 685,233

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1983, 3346861

Int. Cl.[4] B01J *8/18*

U.S. Cl. 422—140 **20 Claims**



1. A device for the acceleration of a reaction between media of solid and liquid phase, comprising:

means for forming a fluidized bed, wherein a solid medium is held suspended in a liquid medium, including

a sieve drum,

a first cylindrical sieve disposed within the sieve drum,

means for controlling operational parameters for creating a pressure drop so that the liquid medium passes radially through said first cylindrical sieve and maintains the solid phase in suspension;

means for generating a centrifugal field for acting on the fluidized bed including a shaft means for rotating said sieve drum and said first cylindrical sieve about a vertical axis of the sieve drum;

means for introducing the liquid medium outside the first cylindrical sieve;

means for defining a reaction chamber disposed radially inward of said first cylindrical sieve having a top and a bottom;

a drum bottom of said sieve drum for bounding the bottom of the reaction chamber;

an annular rim for bounding the top side of the reaction chamber;

means for defining an annular discharge chamber above the top of the reaction chanber;

means for defining a first discharge bore in said annular rim disposed at substantially the same radial height as the first cylindrical sieve, and for connecting the discharge chamber with the reaction chamber;

means for defining a pressure chamber between said first cylindrical sieve and said sieve drum having a top bounded by said annular rim, and having a bottom bounded by the drum bottom;

means for defining a second annular chamber disposed below the drum bottom; bottom;

means for defining a circulation bore for connecting the second annular chamber with the pressure chamber;

an inner second cylindrical sieve for defining a radially-inward side of said reaction chamber disposed radially inward of said discharge bore;

wherein said means for introducing the liquid medium comprise a feed line for introducing the liquid medium into said second annular chamber, wherein the second annular chamber extends to a radial region near said shaft means, and wherein the feed line enters said chamber in the radial region near said shaft means; and

means for introducing the solid medium into said reaction chamber comprising a central filling pipe.

4,710,357

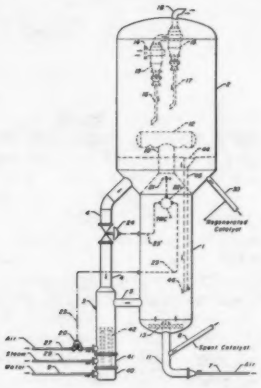
FCC COMBUSTION ZONE CATALYST COOLING APPARATUS

Ismail B. Cetinkaya, Mt. Prospect, and Daniel N. Myers, Arlington Heights, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 687,352, Dec. 28, 1984, Pat. No. 4,578,366. This application Aug. 12, 1985, Ser. No. 764,360

Int. Cl.[4] B01J *8/18*

U.S. Cl. 422—144 **8 Claims**



1. An apparatus for the combustion of a combustible material present on fluidized solid particles which apparatus comprises:

(a) a vertically oriented combustion chamber having a cylindrical vertical sidewall, with an opening being located in said sidewall;

(b) a disengagement chamber located superadjacent to said combustion chamber and in communication therewith, there being a hot fluid particle collection section located at the bottom of said disengagement chamber;

(c) a cooling chamber surrounding at least one heat exchanger, the cooling chamber being in close proximity to a lower portion of said combustion chamber, the cooling chamber having an upper particle inlet opening and a lower particle outlet opening, with the entire heat exchanger being located below both said openings;
(d) a hot particle conduit of vertical orientation connecting said hot particle collection section of the disengagement chamber with said cooling chamber particle inlet opening such that hot particles can flow downwardly from said disengagement chamber to said cooling chamber;
(e) a particle flow restriction means in said hot particle conduit;
(f) an open passageway connecting said particle outlet opening of said cooling chamber with the opening located in said sidewall of said combustion chamber and providing means for the flow of cooled particles and fluidizing gas from said heat exchanger to said combustion chamber;
(g) a fluidizing gas inlet conduit connected to a bottom portion of the cooling chamber providing means for the passage of fluidizing gas onto the shell side of said heat exchanger and maintaining a fluidized catalyst bed within the cooling chamber; and,
(h) a means to control the flow of fluidizing gas in said fluidizing gas inlet conduit.

4,710,358

APPARATUS FOR CHANGING THE SURFACE TENSION OF CUP-LIKE CONTAINERS

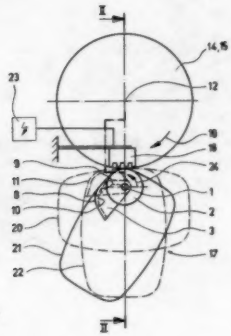
Hans Neuhaus, Giffers, Switzerland, assignor to Polytype AG, Switzerland

Filed Jul. 9, 1986, Ser. No. 883,541

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1985, 3524985

Int. Cl.[4] B01J *19/08*

U.S. Cl. 422—186.05 **3 Claims**



1. An apparatus for changing the surface tension of cup-like containers of round, oval and similar forms without corners by a corona treatment, wherein a cup-like container is adapted to rest with its interior side walls on a mandrel, comprising a rotatable mandrel having an axle, said mandrel having a rotation symmetrical cross section of a diameter which is equal to or smaller than the smallest diameter of the cup-like container to be treated, at least one drive wheel overlying said container and the mandrel, the cup-like container being caused by driving engagement of said drive wheel as it is pressed against the outer side wall of the container to roll off on the mandrel, an electrode opposite to said mandrel which is connected as a counter electrode, an electrode associated with said mandrel, at least one guide shoe pivotal on said axle and being electrically connected with said mandrel and having a surface toward the inside of a wall of the cup-like container extending initially away from said mandrel in a tangential direction and being spring supported in such a way that said guide shoe applied against the wall of the cup-like container.

4,710,359

GAS GENERATOR

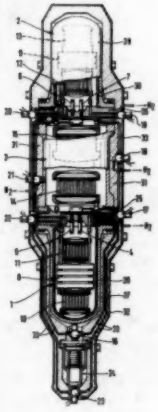
Hermann Erdmann, Weyhe, and Heiko Rahm, Hamburg, both of Fed. Rep. of Germany, assignors to Erno Raumfahrttechnik GmbH, Bremen, Fed. Rep. of Germany

Filed Mar. 8, 1985, Ser. No. 709,510

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 3408592

Int. Cl.[4] B01J *7/00;* **B01D** *13/00, 53/36*

U.S. Cl. 422—191 **6 Claims**



1. Gas generator device for use in orbital space stations, satellites, or space vehicles comprising:
a first and a second process chamber, each including at least one catalytic means for decomposing a liquid energy carrier to obtain a blend of pressurized gas, each of said first and second process chambers further including (i) a first separator for separating the components of the gas as produced by said catalytic means (ii) a supplemental catalytic converter for receiving residual pressurized gas and (iii) a second separator connected to said supplemental catalytic converter for separating product gas from the pressurized gas produced therein;
a first means for removing gas produced in each of said process chambers from said generator device;
a third common chamber
intermediate said first and second process chambers, means alternatingly communicating said third chamber with said first and second process chambers for receiving unseparated product gas from the second separator thereof and including means for completing the separation;
a plurality of second means for separately removing different individual components of the gaseous components from said third intermediate chamber separating means; and
means for alternatingly feeding liquidous energy carrier to the first and second process chambers.

4,710,360

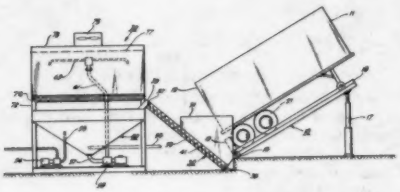
APPARATUS FOR DISSOLVING UREA AND OTHER ENDOTHERMIC MATERIALS

Bruce Harbolt, Northridge; Perry L. Murata, Torrance, and Neal C. Burmaster, Anaheim, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 668,036, Nov. 5, 1984, Pat. No. 4,610,714. This application Jun. 11, 1986, Ser. No. 872,807

Int. Cl.[4] B01D *11/02*

U.S. Cl. 422—269 **9 Claims**



1. An apparatus for dissolving endothermic materials, without fossil fuel-derived heat, which comprises:

(a) a mixing tank, means for introducing endothermic material, as a solid phase, into said mixing tank, a process water feed pipe connected to said mixing tank for feeding process water into said mixing tank for forming a slurry of the endotheric material and the process water, and a slurry discharge pipe connected to said mixing tank for removing the slurry from said mixing tank,

(b) an orificed spray pipe, in fluid communication with said slurry discharge pipe, said orificed spray pipe being positioned above said mixing tank and arranged so as to spray droplets of the slurry downwardly into said mixing tank, and

(c) a spray box enclosing said spray pipe, and having an open bottom to thereby allow the spray droplets to descend into said mixing tank, said spray box further having an opening for air and a fan in flow communication with said opening for drawing ambient air throught the spray box for direct heat exchange with the spray droplets.

4,710,361

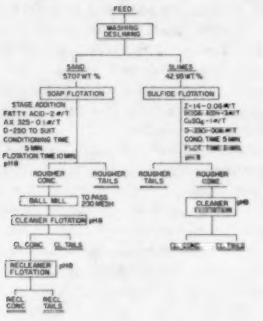
GOLD RECOVERY BY SULHYDRIC-FATTY ACID FLOTATION AS APPLIED TO GOLD ORES/CYANIDATION TAILINGS

Antonio M. Ostrea, 19 Istanbul Street, Merville Park Subdivision, Paranaque, Metro Manila, Philippines

Continuation of Ser. No. 665,341, Oct. 26, 1984, abandoned, which is a continuation-in-part of Ser. No. 566,810, Dec. 29, 1983, abandoned. This application Apr. 2, 1986, Ser. No. 848,326

Int. Cl.[4] C22B *7/00*

U.S. Cl. 423—26 **4 Claims**



1. In a process of upgrading residual gold values from gold cyanidation tailings which comprises treating the said tailings by froth flotation in the presence of a combination of flotation collectors, the improvement consisting of fractionating the flotation feed (90% passing 6.5 mesh) into sand (+200 mesh) and slimes (31 200 mesh) and separately subjecting the sand portion to soap flotation using a sulfhydric-fatty acid combination as the collector, and the slime portion to sulfide flotation using sulfhydric collectors.

4,710,362

SELECTIVE RECOVERY OF CARBON DIOXIDE

Edward C. Y. Nieh, Austin, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed May 5, 1986, Ser. No. 859,560

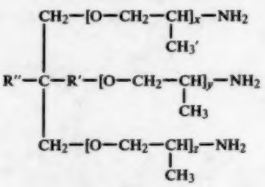
Int. Cl.[4] C01B *17/16, 31/20*

U.S. Cl. 423—228 **5 Claims**

1. In a method for the selective separation of carbon dioxide from a stream of acid gas containing carbon dioxide and sulfur-containing acid gas components including hydrogen sulfide the improvement which comprises the steps of:

countercurrently contacting said gas stream in an absorption zone with a treating agent to thereby selectively remove a substantial portion of the carbon dioxide from said gas stream by absorption into said treating agent, discharging a gas stream from said absorption zone containing a significantly reduced amount of carbon dioxide and discharging said treating agent enriched with absorbed carbon dioxide from said absorption zone,

said treating agent being an aqueous solution containing from about 35 wt. % to about 55 wt. % of a polyoxypropylene triamine having the formula:



Wherein:

R' represents a methylene group and R'' represents hydrogen or methyl or ethyl and wherein the sum of x+y+z is a positive integer having a value of from about 4 to about 6,

said polyoxypropylene triamine having a molecular weight of about 320 to about 475 and said aqueous solution having an amine concentration of about 2.5 to about 3.5 meq/g.

4,710,363

PROCESS OF REMOVING SO_x AND NO_x FROM WASTE GASES

Heinrich Frühbuss, Hubert-Reissnerstr. 5a, 8032 Gräfelfing, Fed. Rep. of Germany

Continuation of Ser. No. 674,018, Nov. 21, 1984, Pat. No. 4,629,609. This application Sep. 22, 1986, Ser. No. 910,363

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1983, 3342500

The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.

Int. Cl.[4] B01J *8/00;* **C01B** *17/00, 21/00*

U.S. Cl. 423—239 **2 Claims**

1. Process of removing SO_x and NO_x from waste gases which comprises the steps of and in sequence

(1) removing substantially all of the SO_x present in the gas by contacting said waste gas with an adsorptive coke having an adsorption capacity for SO_2 of above 40 g SO_2 per kg of coke,

(2) introducing NH_3 into the gas now substantially free of SO_x,

(3) subjecting the NH_3 containing gas to contact with a catalyst having an adsorptive capacity for SO_2 of below, 10 g per kg of catalyst containing as effective ingredient at least one member of the group of aluminum, copper, cobalt, nickel, iron and vanadium oxide supported on a granular refractory material for reducing the NO_x to N_2, and

(4) recovering the SO_x and NO_x free gas.

4,710,364

CONTINUOUS RECOVERY OF SULFUR OXIDE FROM FLUE GAS

W. Wes Berry, Lakeland, Fla., assignor to Advanced Separation Technologies Incorporated, St. Petersburg, Fla.

Filed Sep. 10, 1986, Ser. No. 905,512

Int. Cl.[4] B01S *8/00*; C01B *17/00, 17/48*; C05B *11/04*

U.S. Cl. 423—244 **11 Claims**

1. A process for removing sulfur dioxide from flue gas, comprising:

(i) arranging a plurality of adsorption chambers for rotation about a fixed vertical axis, said chambers containing adsorption particles capable of absorbing sulfur dioxide and of desorbing sulfuric acid when contacted with water;

(ii) conducting flue gas containing sulfur dioxide and particulate material through a precipitator to at least partially remove said particulate material, while allowing flue gas containing sulfur dioxde to pass through the precipitator;

(iii) conducting said flue gas containing sulfur dioxide through a first fixed port and through said chambers containing said adsorption particles in sequence while said chambers are rotating about said fixed axis and adsorbing sulfur dioxide on the surface of adsorption particles

(iv) regenerating said adsorption particles by conducting water through a second fixed port and through said chambers in sequence after said flue gas conducting step to produce and desorb sulfuric acid from said adsorption particles in the form of weak sulfuric acid;

(v) discharging said flue gas from said chambers before said regenerating step (iv), and subsequently;

(vi) discharging said sulphuric acid from said chambers; and

(vii) mixing said sulfuric acid with ground phosphate rock to produce normal superphosphate.

4,710,365

PROCESS FOR THE DRY REMOVAL OF SULFUR DIOXIDE FROM FLUE GAS

Georg R. U. Gebhard, Reichshof; Klaus R. G. Hein, Bergheim-Ahe, and Wolfgang Glaser, Frechen, all of Fed. Rep. of Germany, assignors to Rheinisch-Westfalisches Elektrizitatswerk Aktiengesellschaft, Essen, Fed. Rep. of Germany

Division of Ser. No. 526,904, Aug. 26, 1983, abandoned. This application Aug. 9, 1985, Ser. No. 764,844

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1982, 3232080

Int. Cl.[4] C01B *17/00*; B01J *8/00*

U.S. Cl. 423—244 **1 Claim**

1. A process for the dry removal of sulfur dioxide from a fossil-fuel flue gas containing same together with fly ash, consisting essentially of the steps of:

(a) treating the flue gas with a finely divided particulate capable of reacting with said sulfur dioxide by directly contacting said gas with said particulate in a dry state said particulate being a calcium or magnesium compound selected from the group consisting of the oxides, hydroxides, carbonates and mixtures thereof;

(b) dry separating particles from said flue gas to form a mass of dry recovered solids containing fly ash, unreacted particulate and reaction products of said particulate with said sulfur dioxide;

(c) dry milling said recovered solids;

(d) treating said recovered solids with liquid water or water vapor;

(e) continuously recycling at least part of the milled recovered solids after the treatment thereof with liquid water or water vapor, to contact with said flue gas for further absorption of said sulfur dioxide from said flue gas by said recovered solids by mixing the recovered solids with coal and milling the resulting mixture and thereby feeding the mixture into a burner in a combustion chamber in which said flue gas is produced; and

(f) continuously adding to the recycled milled recovered solids from the treatment thereof with liquid water or water vapor a quantity of said compound.

4,710,366

METHOD FOR PRODUCING STABILIZED WET PROCESS PHOSPHORIC ACID WITH LOW CONTENT OF MAGNESIUM AND ALUMINUM

Vivian C. Astley, New Orleans, and Jody J. Taravella, Harvey, both of La., assignors to Freeport Minerals Company, New Orleans, La.

Filed Oct. 23, 1986, Ser. No. 922,420

Int. Cl.[4] C01B *25/6*

U.S. Cl. 423—321 R **20 Claims**

1. A method for producing wet process phosphoric acid with low post-precipitation characteristics and reduced aluminum and magnesium levels from an unclarified dilute wet process phosphoric acid containing aluminum and magnesium impurities and having a fluorine to magnesium oxide weight ratio of less than about 2.5:1, comprising the steps of:

(a) mixing fluosilicic acid with said unclarified dilute wet process phosphoric acid in an amount sufficient to provide a fluorine to magnesium oxide weight ratio of about 2.5:1.0 to about 10.1:1.0 to form a mixture thereof;

(b) concentrating said mixture to a P_2O_5 content of about 45 to about 55 percent by weight;

(c) subjecting the resulting concentrated mixture to crystallizing conditions for at least 8 hours whereby impurities are crystallized;

(d) clarifying the resulting concentrated mixture containing crystallized impurities until the total solids are reduced to less than about 2 percent by weight; and

(e) concentrating the resulting clarified wet process phosphoric acid to a P_2O_5 content of about 56 percent to about 63 percent by weight to provide a phosphoric acid product having low post-precipitation characteristics and reduced magnesium and aluminum levels.

4,710,367

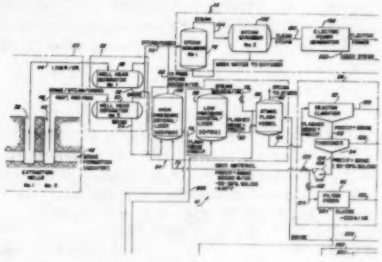
PROCESS FOR REDUCING THE CONCENTRATION OF HEAVY METALS IN GEOTHERMAL BRINE SLUDGE

Morton M. Wong, Placentia, and Arnold L. Shugarman, Santa Ana, both of Calif., assignors to Union Oil Co. of California, Los Angeles; Mono Power Co., Rosemead and Southern Pacific Land Co., San Francisco, all of, Calif.

Filed Oct. 15, 1984, Ser. No. 661,154

Int. Cl.[4] C01B *33/12*

U.S. Cl. 423—335 **40 Claims**



1. A process for reducing the total concentration of heavy

metal in silica sludge precipitated from a flow of geothermal brine, the process comprising:

(a) washing the silica sludge with hot water so as to replace with said water geothermal brine which is entrapped in said sludge;

(b) contacting the washed sludge with a hydrochloric acid solution having a weight ratio of hydrochloric acid relative to said washed sludge causing the pH of the acid-sludge mixture to be less than about 1;

(c) separating a silicious solids residue from the hydrochloric acid solution, and

(d) washing the silicious solids residue with water to flush hydrochloric acid solution from said residue.

4,710,368

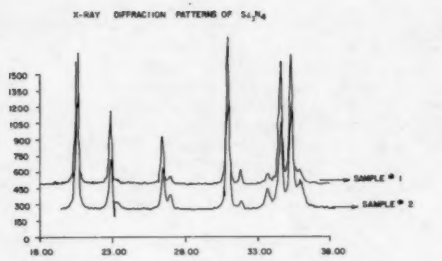
HIGH PURITY HIGH SURFACE AREA ALPHA CRYSTALLINE SILICON NITRIDE

Joseph E. Ritsko, and Howard L. Acla, both of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 748,080, Jun. 24, 1985. This application May 19, 1986, Ser. No. 864,614

Int. Cl.[4] C01B *21/068, 33/06*

U.S. Cl. 423—344 **4 Claims**



1. High purity silicon nitride particles which are essentially alpha crystalline, said silicon nitride particles having a surface area of greater than about 25 m^2/g.

4,710,369

OXIDATION METHOD FOR PRODUCTION OF SPECIAL ALUMINAS FROM PURE ALUMINUM CHLORIDE

Lee H. Bergman, Baton Rouge, La., assignor to Toth Aluminum Corporation, Metairie, La.

Filed Jun. 10, 1986, Ser. No. 872,600

Int. Cl.[4] C01F *7/02*

U.S. Cl. 423—625 **20 Claims**

1. A process for producing alumina from anhydrous aluminum chloride which comprises reacting said anhydrous aluminum chloride with an oxidizing agent having a temperature within the range of from about 700° C. to less than 1,150° C. while introducing chlorine in the presence of said aluminum chloride and oxidizing agent, thereby increasing the yield of said alumina produced from said aluminum chloride and oxidizing agent.

4,710,370

METHOD FOR DETECTION OF CUSHING'S SYNDROME IN DOMESTIC ANIMALS

Dennis W. Macy, Fort Collins, Colo., assignor to Colorado State University Research Foundation, Fort Collins, Colo.

Filed Apr. 25, 1985, Ser. No. 727,367

Int. Cl.[4] A61K *49/00*

U.S. Cl. 424—9 **5 Claims**

1. A method for diagnosing Cushing's Syndrome in animals, said method comprising the steps of:

(a) administering a pharmaceutical dose of glucagon to an animal suspected of having Cushing's Syndrome;

(b) taking a blood sample from the animal between about 15 and about 60 minutes after administration of the glucagon;

(c) exposing the blood sample to a test which compares the blood glucose level of the sample to an indicator of blood glucose level which is capable of indicating a blood glucose level greater than about 295 mg/dl; and

(d) noting a blood glucose level greater than about 295 mg/dl and thereby diagnosing Cushings's Syndrome in the animal.

4,710,371

WATERPROOF SUNSCREEN COMPOSITIONS

Victor Palinczar, 435 Adeline St., Trenton, N.J. 08611

Filed Feb. 19, 1986, Ser. No. 830,838

Int. Cl.[4] A61K *7/42, 7/44, 9/12*

U.S. Cl. 424—47 **21 Claims**

1. A water-proof sunscreen composition comprising:

A. from about 5% to about 98% by weight of isobutylene-butene copolymers having an average molecular weight from about 200 to about 2500; and

B. from about 1.0% to about 30.0% by weight of an active ultraviolet radiation absorber.

4,710,372

DENTIFRICE FOR HYPERSENSITIVE TEETH

Hans-Ulrich Scheller, Eislingen/Fils, Fed. Rep. of Germany, assignor to Wurttembergische Parfumerie-Fabrik GmbH, Eislingen/Fils, Fed. Rep. of Germany

Continuation of Ser. No. 731,286, May 7, 1985, Pat. No. 4,634,589. This application Sep. 25, 1986, Ser. No. 911,426

Claims priority, application Fed. Rep. of Germany, May 18, 1984, 3418427

The portion of the term of this patent subsequent to Jan. 6, 2004, has been disclaimed.

Int. Cl.[4] A61K *7/16, 7/18*

U.S. Cl. 424—49 **4 Claims**

1. A dentifrice for hypersensitive teeth containing essentially at least 15% by weight of hydroxylapatite or fluoroapatite of an average of particle size of less than 8 microns and an abrasion value (RDA) of less than 30 as the sole crystalline and polishing substance, the dentifrice containing no further soluble mineral salts.

4,710,373

LONG WAVELENGTH ULTRAVIOLET RAY ABSORBER

Koichi Nakamura, Ichikaimachi; Michihiro Hattori, Utsunomiya; Tadashi Tamura, Ichikaimachi; Toru Tejima, Kokubunjimachi; Naotake Takaishi; Genji Imokawa, both of Utsunomiya, and Hajime Hotta, Funabashi, all of Japan, assignors to Kao Corporation, Tokyo, Japan

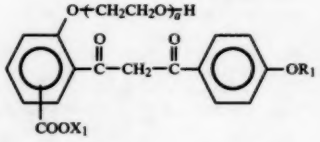
Filed Mar. 12, 1985, Ser. No. 710,714

Claims priority, application Japan, Mar. 12, 1984, 59-46850

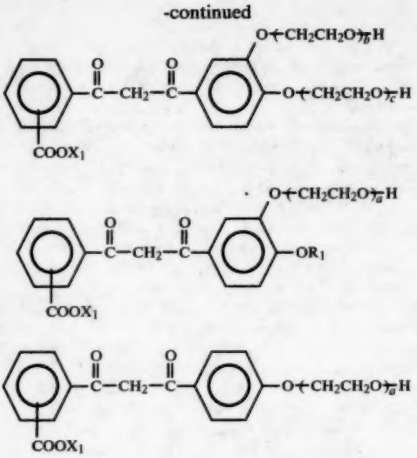
Int. Cl.[4] A61K *7/021, 7/027, 7/42, 9/10*

U.S. Cl. 424—59 **5 Claims**

1. A long wavelength ultraviolet ray absorber composition comprsing 0.1 to 20 wt. % of a dibenzoylmethane derivative selected from the group consisting of



-continued



in which X_1 represents hydrogen, sodium, potassium, lithium, trimethylethanolamine, or arginine; R_1 represents a hydrogen atom, or a hydrocarbon group having from 1 to 18 carbon atoms; a is an integer of from 1 to 10, and c are independently integers of from 1 to 6; and an inert cosmetic carrier.

4,710,374

COSMETIC COMPOSITION CONTAINING CATIONIC POLYMERS AND ANIONIC LATEXES

Jean F. Grollier, Paris, and Claude Dubief, Versailles, both of France, assignors to L'Oreal, Paris, France

Filed Feb. 16, 1983, Ser. No. 467,185

Claims priority, application Luxembourg, Feb. 16, 1982, 83949

Int. Cl.[4] **A61K** *7/04, 7/06, 7/13;* **A45D** *7/00*

U.S. Cl. 424—61 **15 Claims**

1. A process for treating hair, nails and/or skin, which comprises applying to hair, nails and/or skin a cosmetically acceptable medium containing about 0.01 to 10% by weight of at least one cationic polymer of the polyamine, polyamino polyamide or poly-(quaternary ammonium) type containing amine or ammonium groups in or joined to the polymer chain, said cationic polymer having a molecular weight of 500 to 3,000,000, and about 0.01 to 10% by weight of at least one anionic latex which is in the form of a colloidal suspension of particles of polymers containing anionic functional groups, in an aqueous or organic liquid phase, said anionic functional groups being introduced by (i) the polymerization or copolymerization of anionic monomers, by (ii) combination of an anionic free radical derived from a reaction initiator with one or more monomers, during the initiation of the polymerization of the said monomer(s), by (iii) the juxtaposition of these two processes, or by (iv) the introduction of end groups via a chain transfer reaction in the process (ii).

4,710,375

STICK COSMETICS CONTAINING COATED PEARLESCENT PIGMENTS

Yutaka Takasuka, Kamakura; Kunihiko Mohri, Shizuoka, and Akiko Kawaguchi, Shimizu, all of Japan, assignors to Pola Chemical Industries Inc., Japan

Division of Ser. No. 632,334, Jul. 19, 1984, Pat. No. 4,648,908. This application Nov. 12, 1986, Ser. No. 929,529

Claims priority, application Japan, Feb. 28, 1984, 59-36985

Int. Cl.[4] **A61K** *7/035;* **C04B** *14/00;* **C09C** *1/00*

U.S. Cl. 424—69 **9 Claims**

1. A stick-type cosmetic comprising gypsum and a pearlescent pigment composition; said pigment composition comprising at least one coated pigment and including water to the amount of at least 20 wt.% of said pigment composition, said pigment being selected from the group consisting of titanium dioxide-coated mica, colored titanium dioxide-coated mica, and colored bismuth oxychloride, coated on the surfaces thereof with a water-repellant coating of a metallic soap of the formula-

$$(RCOO)_nM$$

wherein R is selected from straight chain, branched chain, saturated and unsaturated aliphatic hydrocarbon groups having more than 6 carbon atoms, M is selected from aluminum and zinc and n is the valance of the metal, said surface coating being prepared by reacting in an aqueous medium an alkaline salt of an aliphatic acid radical $(RCOO)^-$ with a mineral acid metal salt where said metal is M as defined above in a theoretical equivalent ratio of 1:4 to 1:10 and in an amount to cause said water-repellent soap to form and coat the surfaces of said pigment and wherein the wt. ratio of said pigment to said metallic soap being from 1:0.01 to 1:0.1.

4,710,376

TOPICAL THERAPEUTIC COMPOSITION CONTAINING OXIDATION INHIBITOR SYSTEM

Sean A. Evans, High Bridge; Eva A. Terpinski, New Brunswick, and Douglas Testa, Neshanic Station, all of N.J., assignors to Interferon Sciences, Inc., New York, N.Y.

Filed Feb. 1, 1985, Ser. No. 697,320

Int. Cl.[4] **A61K** *31/745, 45/02*

U.S. Cl. 424—83 **18 Claims**

1. A substantially non-toxic, stable, topical therapeutic composition which comprises:

(a) a lymphokine which is susceptible to oxidative degradation;

(b) an oxidative degradation-inhibitory amount of a redox system containing

(1) a water soluble polymer containing a plurality of reducing moieties covalently bound thereto and

(2) a water soluble polymer containing a plurality of oxidizing moieties covalently bound thereto; and,

(c) an aqueous vehicle base compatible with the lymphokine which is capable of holding the lymphokine in suspension and releasing a therapeutically effective amount of lymphokine at the site of application.

2. The therapeutic composition of claim 1 wherein the lymphokine is one or more natural or recombinant interferons.

4,710,377

ANTIGENS AND MONOCLONAL ANTIBODIES REACTIVE AGAINST SPOROZOITES OF *EIMERIA SPP.*

Robert H. Schenkel, Yardley, Pa.; Rosie B. Wong, Piscataway, and Pallaiah Thammana, Hazlet, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 524,819, Aug. 19, 1983, abandoned. This application Mar. 19, 1984, Ser. No. 591,288

Int. Cl.[4] **G01N** *33/53;* **C12P** *21/00;* **A61K** *39/00, 45/02*

U.S. Cl. 424—88 **14 Claims**

1. Monoclonal antibodies produced by hybridomas formed by fusion from mouse myeloma line P3X63.Ag8.653 cells and spleen cells from BALB/c mouse previously immunized with *Eimeria tenella* sporozoites, which antibody:

(a) reacts specifically with antigens of Eimeria spp. sporozoites;

(b) reacts specifically with antigens of *Eimeria tenella* having a molecular weight of approximately 13 to 150 Kd; and

(c) is produced by the hybridomas designated clone number s1C4 and deposited as ATCC number HB8333; hybridoma designated clone number s3D3 and deposited as ATCC number HB8331; and hybridoma designated clone number s1E5 and deposited as ATCC number HB8332.

4,710,378

LYOPHILIZED HEPATITIS B VACCINE

Nobuya Ohtomo; Kyosuke Mizuno; Fukusaburo Hamada, and Hiroshi Mizokami, all of Kumamoto, Japan, assignors to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute, Kumamoto, Japan

Filed Mar. 8, 1985, Ser. No. 709,705
Claims priority, application Japan, Mar. 13, 1984, 59-48669
Int. Cl.[4] A61K *39/29*
U.S. Cl. 424—89 3 Claims

1. A lyophilized preparation of hepatitis B vaccine, which comprises a purified hepatitis B virus surface antigen produced by a recombinant organism being capable of producing HBs antigen, which is adsorbed on aluminum gel in the lyophilized state in the presence of a stabilizer, said lyophilized preparation being prepared by the steps of adding an aluminum gel and a stablizer to a purified recombinant-origin HBs antigen and lyophilizing the mixture, wherein the stabilizer is a combination of at least one amino acid or a salt thereof, at least one saccharide or sugar alcohol and at least one colloidal substance.

4,710,379

INTESTINAL MICROFLORA-IMPROVING AGENT

Yasuo Kawai, Atsugi, and Hirotaka Shimohashi, Kodaira, both of Japan, assignors to Kabushiki Kaisya Advance Kaihatsu Kenkyujo, Tokyo, Japan

Continuation of Ser. No. 737,057, May 23, 1985, abandoned. This application Dec. 4, 1986, Ser. No. 938,348
Claims priority, application Japan, Jun. 19, 1984, 59-124584
Int. Cl.[4] A61K *35/74, 35/78*
U.S. Cl. 424—93 2 Claims

1. A method of selectively stimulating the growth of intestinal lactic acid bacteria, which comprises orally administering an effective amount of bacterial cells, or an extract thereof, of a microorganism belonging to the genus Streptococcus to a person recognized as being deficient in intestinal lactic acid bacteria.

4,710,380

TREATMENT OF AUTOIMMUNE DISORDERS WITH IMMUNOAMPLIFIERS

A. Arthur Gottlieb, New Orleans, La., assignor to Imreg, Inc., New Orleans, La.

Filed Apr. 4, 1986, Ser. No. 848,210
Int. Cl.[4] A61K *35/14*
U.S. Cl. 424—101 18 Claims

1. A method of treating human or mammalian subjects for disorders characterized by hyperactive immune response, comprising the administration to said subject of an effective dosage amount of an amplifier of the immune system in a pharmaceutically acceptable carrier.

16. As an article of manufacture, an effective biweekly dosage amount of an amplifier of the immune system for the treatment of an autoimmune disorder, said dosage amount being in a pharmaceutically acceptable carrier, and said dosage amount being approximately 10^5 to 10^8 times the amount of said amplifier found to produce a maximal delayed type hypersensitivity response to antigen in a skin test.

4,710,381

METHOD FOR MAINTAINING INTACT, NON-DEGRADED FACTOR VIII/VON-WILLEBRAND FACTOR DURING BLOOD PROCESSING

Thomas J. Kunicki, Brookfield, and Robert R. Montgomery, Mequon, both of Wis., assignors to The Blood Center of Southeastern Wisconsin, Milwaukee, Wis.

Filed May 22, 1984, Ser. No. 612,873
Int. Cl.[4] A61K *35/16;* C07K *15/00*
U.S. Cl. 424—101 20 Claims

1. A method of preparing blood or plasma for the extraction of intact, non-degraded FVIII/vWf, the blood or plasma containing FVIII/vWf and cellular sources of a calcium activated protease capable of cleaving the FVIII/vWf, said method including the step of removing substantially all cellular sources of the calcium activated protease from the blood or plasma while avoiding release of the protease from the cellular sources prior to or during removal of the cellular sources from the blood or plasma.

14. A method of preparing blood or plasma for the extraction of intact, non-degraded FVIII/vWf, the blood or plasma containing platelets and FVIII/vWf, said platelets comprising a source of a calcium activated protease capable of cleaving the FVIII/vWf, said method including the steps of obtaining platelet poor plasma while avoiding release of the protease from the platelets and adding a chelating agent to the platelet poor plasma to prevent calcium in the plasma from activating the protease.

20. A method of obtaining intact, non-degraded FVIII/vWf from blood or plasma containing FVIII/vWF and cellular sources of a calcium activated protease capable of cleaving the FVIII/vWf, said method comprising the steps of:

obtaining platelet poor plasma while avoiding release of the calcium activated protease from the cellular sources;

passing the platelet poor plasma through a filter capable of retaining particles 0.1 micron in size and larger for removing substantially all cellular sources of the calcium activated protease from the platelet poor plasma; and

purifying FVIII/vWf from the filtered plasma.

4,710,382

TREATMENT FOR OSTEOPOROSIS USING HGRF(1-40)NH_2

Robert R. Recker, 3309 S. 116th St., Omaha, Nebr. 68144

Filed Sep. 27, 1985, Ser. No. 780,949
Int. Cl.[4] A61K *37/02, 35/55*
U.S. Cl. 424—108 10 Claims

1. A method of treating osteoporosis, comprising:

administering to a patient an effective amount of human GRF(1-44)—NH_2, to stimulate the pituitary growth hormone release; and

continuing said administration until bone mass increases and the patient's calcium balance becomes positive and indicates mineral accumulation in the skeleton.

4,710,383

PHARMACEUTICAL DERMAL COMPOSITIONS WITH PROLONGED AND CONTINUOUS ACTION BASED ON ESSENTIAL FATTY ACIDS

P. R. Dick, 95 avenue de la Lanterne, 06000 Nice, France

Filed Jul. 8, 1983, Ser. No. 511,941
Claims priority, application France, Jun. 29, 1983, 83 10735
Int. Cl.[4] A61L *15/03;* A61F *13/00;* A61K *9/70*
U.S. Cl. 424—449 18 Claims

1. In a transdermal delivery device for providing continuous and regulated release of essential fatty acids to a mammal, to prevent disorders associated with a deficiency in essential fatty acids, the improvement comprising incorporating therein from 5 to 35% of the total weight of an active component which is selected from the group consisting of linoleic acid (18:2ω6), γ-linolenic acid (18:3ω6), arachidonic acid (20:4ω6), γ-homolinolenic acid (20:3ω6), linoleic acid (18:3ω3), eichosapentaenoic acid (20:5ω3), docosahexaenoic acid (22:6ω3), their linear and branched C_{1-4} esters, and mixtures thereof, diffusion regulators for said active component selected from the group consisting of nitrogenous compounds and azo compounds, and stabilizing agents for said active component comprising antioxidants selected from the group consisting of alpha tocopherol and its esters, phenol and its aromatic derivatives, polyphenols and propyl, butyl or octyl gallates.

4,710,384

SUSTAINED RELEASE TABLETS MADE FROM MICROCAPSULES

Avner Rotman, 6 Alkalai Street, Rehovot, Israel

Filed Jul. 28, 1986, Ser. No. 889,775
Int. Cl.[4] A61K *9/50, 9/28, 9/26, 9/22*
U.S. Cl. 424—465 6 Claims

1. A new sustained release galenical form in the form of a disintegratable tablet, comprising compressed microcapsules of active principle and a pharmaceutically acceptable excipient interspersed among and throughly mixed with said microcapsules, wherein said microcapsules have a size range distributed between about 5 and about 300 microns and comprise particles of active principle coated with an encapsulating layer of an ethyl cellulose or acrylic resin sustained release polymer containing a sufficient amount of plasticizer to render said coating flexible, said amount being within the range of about 15 to about 30% of the weight of said sustained release polymer, said coating being no thicker than that which forms 25% of the weight of the active principle.

4,710,385

COMBINATION SOAP AND FISH BAIT

Ken M. Vickers, Rte. #1, Ambrose, Ga. 31512

Filed Nov. 5, 1986, Ser. No. 927,158
Int. Cl.[4] A01K *85/00;* C11D *9/38, 9/40, 17/00*
U.S. Cl. 426—1 2 Claims

1. A fish bait composition consisting essentially of about 55% soap carrier, about 1% poultry liver, about 4% salmon oil, about 10% fish meal and about 30% cottonseed meal.

2. A fisherman's hand soap for removing the human scent that repels fish consisting essentially of about 55% soap carrier, about 1% poultry liver, about 4% salmon oil, about 10% fish meal and about 30% cottonseed.

4,710,386

ALL NATURAL, READY-TO-EAT ENZYME-SACCHARIFIED CEREAL DERIVED FROM WHOLE CEREAL GRAIN

Charles V. Fulger, Katonah, and Ernest K. Gum, Granit Springs, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Jan. 29, 1985, Ser. No. 696,665
The portion of the term of this patent subsequent to Feb. 14, 2001, has been disclaimed.
Int. Cl.[4] A23L *1/10, 1/164;* A23P *1/00*
U.S. Cl. 426—28 26 Claims

1. A process for preparing an enzyme-saccharified ready-to-eat cereal derived from a whole cereal grain comprising:

(a) milling and separating a whole cereal grain to produce a germ fractioin, a bran fraction and an endosperm fraction;

(b) processing the germ fraction by:

(i) toasting the germ fraction, and

(ii) grinding the toasted germ to a particle size of from 0.25 to 2.0 millimeters;

(c) modifying the bran fraction to improve its functionality by high temperature, high shear extrusion in a counter-rotating twin screw extruder by a process which comprises:

(i) combining bran with water to form a feed having a bran to water ratio of from 5.5:1 to 10:1, said bran containing from 10% to 25% starch on a dry weight basis, said starch either being naturally present in the said bran or admixed therewith;

(ii) introducing the feed into a counter-rotating twin screw extruder;

(iii) extruding the feed at a temperature of from 150° C. to 180° C.; and

(iv) developing a shear rate of from 500 to 2,000 seconds^{-1} in said extruder through which the said feed is extruded;

(d) processing the endosperm fraction by:

(i) milling to a particle size less than 2 millimeters,

(ii) forming a slurry containing from 15 to 60% by weight of said milled endosperm,

(iii) cooking the milled endosperm until substantially all the starch is gelatinized, and

(iv) enzymatically hydrolyzing from 15 to 75% by weight of said endosperm to form soluble saccharides such that the ready-to-eat cereal contains from 7.5 parts sucrose-equivalent sweetness up to 50 parts sucrose-equivalent sweetness;

(e) recombining the ground, toasted germ of step (b)(ii), the modified bran of step (c) and the enzymatically hydrolyzed endosperm of step (d)(iv) to form a cereal dough containing whole grain levels of protein, fiber and digestible carbohydrates;

(f) obtaining a ready-to-eat cereal from said cereal dough.

4,710,387

NUTRITIONAL SUPPLEMENT PREPARATION INTENDED FOR PREGNANT AND BREAST-FEEDING WOMEN BASED ON MILK CONSTITUENTS AS WELL AS A PROCESS FOR PREPARING IT

Dirk J. D. Uiterwaal, Bodegraven, and Aart Hersevoort, Nieuwegein, both of Netherlands, assignors to Melkunte Holland B.V., AE Woerden, Netherlands

Filed Nov. 7, 1985, Ser. No. 795,973
Claims priority, application Netherlands, Nov. 9, 1984, 8403433
Int. Cl.[4] A23C *11/00;* A23L *1/302, 1/304*
U.S. Cl. 426—72 18 Claims

1. Nutritional supplement preparation intended for pregnant and breast-feeding women based on milk constituents, comprising 10–20% by weight of protein, 16–28% by weight of fat, 43–65% by weight of carbohydrates, at least a part of which is hydrolyzed lactose, at most 3.5% by weight of moisture, and minerals, trace elements and vitamins, and, amounts of flavouring and colorant which do not affect the nutritional character of the supplement.

4,710,388

METHOD FOR TREATING PINEAPPLES

Yuan K. Liu, Concord, Calif., assignor to Del Monte Corporation, San Francisco, Calif.

Division of Ser. No. 718,790, Apr. 1, 1985, Pat. No. 4,614,659.
This application Jul. 25, 1986, Ser. No. 889,433
The portion of the term of this patent subsequent to Sep. 30, 2003, has been disclaimed.
Int. Cl.[4] A23B *7/00*
U.S. Cl. 426—102 4 Claims

1. A harvested pineapple possessing the desired degree of maturity and ripeness and having its crown treated with at least 0.01 milligram of a gibberellin whereby withering and senescence of the crown is retarded.

4,710,389

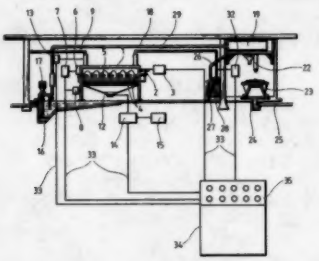
METHOD AND APPARATUS FOR CONTROLLING PEELING MACHINES FOR PEELING FRUIT OR VEGETABLES

Karl-Dietrich Dornow, Kaiser-Friedrich-Ring 96, 4000 Düsseldorf, Fed. Rep. of Germany

Filed Jan. 21, 1986, Ser. No. 821,056
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 3502845
Int. Cl.[4] G01N *33/02;* A23N *7/02*
U.S. Cl. 426—231 13 Claims

1. In a method of controlling a peeling machine for peeling fruit or vegetables supplied thereto, said machine comprising rotary peeling means for the fruit or vegetables including movable peeling rollers having roughened surfaces for peeling the fruit or vehetables, a motor driving said peeling means and means for supplying water to said peeling means, the improvement comprising the steps of checking at least one of peel

waste discharged from said peeling means and the appearance of the peeled fruit or vegetables discharged from said peeling means and adjusting the operation of said machine in dependence upon the magnitude of the at least one of the peeled waste and said appearance, and further comprising the steps of determining the magnitude of one of the amount of said fruit or vegetables instantaneously suppled to said peeling means and the average amount of said fruit or vegetables supplied to said peeling means during a specific unit of time, signalling said magnitude to a computer, determining the quantity of water supplied to said peeling means, determining the quantity of water and waste peelings discharged from said peeling means,



relating said magnitude and said quantitites to one another for establishing a difference therebetween, said difference indicating at least one of the amount of waste peelings instantaneously and the average of said waste peelings over said specific unit of time, using said difference as a starting variable and calculating from said starting variable the ratio of said difference to at least one of said magnitude of said instantaneous and said average amount to determine the ratio of waste peelings to said magnitude, displaying said ratio on a visual display in the computer and adjusting said machine to bring said ratio to a predetermined value and maintaining said ratio at said predetermined value.

4,710,390

INGESTIBLE, HIGH DENSITY, COMPRESSED-TABLET FRUIT FIBER COMPOSITION

Robert W. Schumacher, Kenvil, and Mary B. Houston, Morristown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 882,799, Jul. 7, 1986, Pat. No. 4,680,189. This application Apr. 10, 1987, Ser. No. 36,942

Int. Cl.[4] A23L *1/29*

U.S. Cl. 426—285 **24 Claims**

1. A method for preparing an ingestible, high density, compressed-tablet fruit fiber-composition which comprises:

(A) blending at least one fruit fiber source having a maximum starch content of about 25% by weight of said fruit fiber and a microcrystalline cellulose compression aid to form a homogenous blend;

(B) mixing water with the blend of step (A) at a weight ratio of about 1.5:1 to about 2.5:1, based on the weight of water to the weight of the blend, for a time sufficient to form a cohesive, deformable, plastic mass;

(C) drying the plastic mass of step (B) to a moisture content of less than about 8% by weight, based on the weight of the dried material;

(D) milling the dried product of step (C) to recover granules having a particle size of about 125 to about 840 microns;

(E) blending the granules of step (D) with a tableting lubricant; and

(F) compressing the composition of step (E) into a tablet to form a high density, fruit fiber tablet containing about 30% to about 95% dietary fiber, based on the total weight of the compressed-tablet fruit-composition.

4,710,391

FLAVORING METHOD FOR FRIED FOOD PRODUCTS

Jeffrey F. Kirn, Godfrey, Ill., and James M. Connaughton, Jr., Cincinnati, Ohio, assignors to Conagra, Inc., Omaha, Nebr.

Filed Jun. 11, 1985, Ser. No. 743,501

Int. Cl.[4] A23L *1/22*

U.S. Cl. 426—289 **12 Claims**

1. A method of flavoring food products comprising the steps of:

(a) encapsulating an oil-soluble flavoring agent with an edible, oil impervious, heat resistant, gum arabic encapsulating material;

(b) coating said encapsulated flavoring agent with a flavor modifying agent comprising cooked chicken skins, enzyme modified cheese, amino acid and wheat flour;

(c) adding the resulting coated, encapsulated flavoring agent to a food product; and

(d) frying said food product.

4,710,392

FLAVORING WITH OCT-2-EN-4-OL

Jürgen Brüning; Roland Emberger; Rudolf Hopp, and Theodor Sand, all of Holzminden, Fed. Rep. of Germany, assignors to Haarmann & Reimer GmbH, Holzminden, Fed. Rep. of Germany

Filed Mar. 31, 1986, Ser. No. 846,661

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 3512339

Int. Cl.[4] A23L *1/235*

U.S. Cl. 426—534 **2 Claims**

1. An edible composition comprising a foodstuff and an amount of oct-2-en-4-ol effective to impart a cherry flavour to the composition.

4,710,393

LOW WATER ACTIVITY CONFECTION COMPOSITION

Mark E. Holmgren; Gregory K. Parrish, and Philip A. Cartier, all of Hummelstown, Pa., assignors to Hershey Foods Corporation, Hershey, Pa.

Filed Sep. 15, 1986, Ser. No. 907,079

Int. Cl.[4] A23G *3/32, 3/00*

U.S. Cl. 426—660 **2 Claims**

1. A water-based sugar confection having good flavor and soft texture comprising (a) a total carbohydrate content equal to or greater than fifty percent by weight, dry basis; wherein said carbohydrate ingredient consists essentially of a blend of dextrose and fructose in which the ratio of fructose to dextrose is from 30:70 to 90:10; (b) the moisture content is an amount within the range of from about 4% to about 10%; and (c) the water activity (Aw) is an amount within the range of from about 0.20 Aw to about 0.50 Aw.

4,710,394

PREPARATION AND PROCESS FOR THE PRESERVATION OF PLANTS

Eric L. Sellegaard, 8 Domaine du Camp Lauvas -1575 Rte de Valbonne, 06520 Mougins, France

Filed Jul. 28, 1986, Ser. No. 891,119

Claims priority, application France, Aug. 2, 1985, 85 11992

Int. Cl.[4] C09K *15/32;* **A01G** *5/06;* **B05D** *1/18*

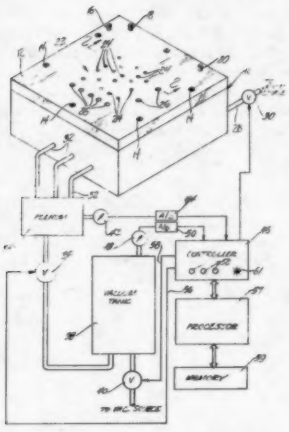
U.S. Cl. 427—4 **9 Claims**

1. A dry preparation for use in dissolved form for the preservation of plants or parts thereof, containing essentially 1–6% by weight of citric acid, 30–60% by weight of at least one dye and 40–60% by weight of at least one inorganic salt formed by at least one cation selected from the group consisting of potassium, sodium, calcium, magnesium and manganese, and at least one anion selected from the group consisting of nitrate, chloride, sulfate, carbonate and phosphate.

4. A solution for the preservation of the plants or parts thereof, containing a dry preparation of claim **1** in a solvent comprising water and glycerol.

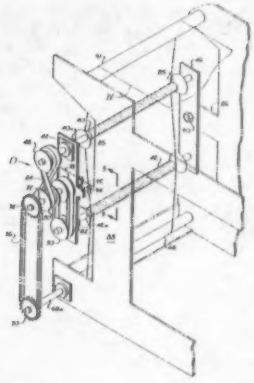
8. A method for the preservation for plants or parts thereof, in which the roots or the lower part of the freshly cut stem of the plant is immersed in the solution of claim 4 and subsequently dried.

4,710,395
METHOD AND APPARATUS FOR THROUGH HOLE SUBSTRATE PRINTING
William M. Young, and Mark E. Wolfe, both of Kokomo, Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.
Filed May 14, 1986, Ser. No. 863,145
Int. Cl.[4] H05K 3/12
U.S. Cl. 427—8 2 Claims



1. A method not only of controllably forming coatings of a printing substance on through holes in insulative substrates but also of concurrently determining variations in quality of the coated substrate, comprising the steps of:
placing a face of an insulative substrate having through-holes therein on a holder while leaving the opposite face of the substrate exposed to atmospheric air, said holder having a first vacuum area, that does not register with said through-holes and is used for hold-down of said insulative substrate on said holder, and a second vacuum area, for registration with said through-holes;
drawing a vacuum in said first vacuum area to secure said insulative substrate to said holder;
depositing a printing substrate over portions of the insulative substrate having said through-holes;
producing a predetermined vacuum in a plenum of predetermined volume for exposure to the second vacuum area;
terminating evacuation of said plenum after establishing said predetermined plenum vacuum;
without resuming said plenum evacuation, exposing said second area to said predetermined plenum vacuum, effective to cause said printing substance to be pulled into said through-holes in a highly controlled manner, and thereby produce a highly controlled coating on substrate walls forming said through holes;
measuring pressure in said plenum at one or more preselected times during a period immediately following exposure of the second vacuum area to the predetermined plenum vacuum; and
comparing each such measured plenum pressure to a reference pressure, whereby potentially unsatisfactory coated insulative substrates are identified.

4,710,396
TEXTILE SLASHER LUBRICATING METHOD AND APPARATUS
Scott O. Seydel, 80 Broad St., N.W., Atlanta, Ga. 30303, and William H. Cutts, P.O. Box 748, Clemson, S.C. 29631
Division of Ser. No. 727,868, Apr. 26, 1985, Pat. No. 4,656,705, which is a continuation-in-part of Ser. No. 308,449, Oct. 10, 1981, Pat. No. 4,513,485. This application Feb. 17, 1987, Ser. No. 15,341
Int. Cl.[4] B05D 1/28
U.S. Cl. 427—8 12 Claims



1. In a textile fluid treatment method wherein fluid is applied to a sheet of textile material consisting of a number of individual textile yarn ends arranged in a side-by-side parallel manner, said method comprising the steps of:
providing an elongated hollow porous rod having a hollow interior and an outer cylindrical porous wall which includes a porous liquid application surface consisting of pores having a mean dimension smaller than the mean diameter of said yarn ends so that a relatively smooth application surface is presented to said individual yarn ends in said sheet of material, and utilizing a liquid distribution layer next adjacent said porous application surface which extends inwardly toward the center of said hollow rod;
metering said luquid through a flow control membrane formed over an interior boundary region of said distribution layer to provide a region having less porosity than said distribution layer and said application surface;
delivering a predetermined amount of said liquid to said interior of said hollow rod and metering said liquid through said flow control membrane whereby said liquid is equalibrated through said distribution layer onto said application surface; and
passing said material over said porous application surface causing said liquid to be applied to said textile yarn ends in a desired amount.

4,710,397
PHOTOELECTRIC CONVERSION DEVICE AND ITS MANUFACTURING METHOD
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Tokyo, Japan
Division of Ser. No. 554,763, Nov. 23, 1983, Pat. No. 4,593,152. This application Jun. 13, 1984, Ser. No. 620,177
Claims priority, application Japan, Nov. 24, 1982, 57-206806; Nov. 24, 1982, 57-206809; Feb. 22, 1983, 58-28211; Apr. 29, 1983, 58-75712; Oct. 31, 1983, 58-204443
Int. Cl.[4] B05D 5/12; H01L 25/00
U.S. Cl. 427—53.1 11 Claims

1. A method of making a photoelectric conversion device in

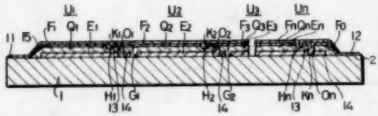
which a plurality n (when n is an integer greater than one) of semiconductor elements U_1 to U_n are sequentially formed side by side by side on a substrate having an insulating surface and conneted in series one after another, the semiconductor element U_i (i=1, 1, . . . n) comprising a first eletrode E_i on the substrate, a non-single-crystal semiconductor laminate member Q_i on the first electrode E_i and a second electrode F_i on the laminate member, the second electrode F_{j+1} of the semiconductor element U_{j+1} (j−1, 2, . . . (n−1)) being connected via coupling portion K_j to the first electrode E_j, comprising the steps of:

forming a first conductive layer on the substrate;

forming (n−1) sequentially arranged first grooves G_1 to G_{n-1} in the first conductive layer by using a first laser beam to form therein n sequentially arranged first electrodes E_1 to E_n separated by the first grooves G_1 to G_{n-1}, respectively;

forming on the substrate a non-single-crystal semiconductor laminate layer having formed therein at least one semiconductor junction and continuously extending onto the first electrode E_1 to E_n and into the first grooves G_1 to G_{n-1};

forming (n−1) sequentially arranged second grooves O_1 to O_{n-1} in the non-single-crystal semiconductor laminate layer by using a second laser beam to form therein n sequentially arranged non-single-crystal semiconductor



laminate members Q_1 to Q_n separated by the grooves O_1 to O_n and extending on the first electrodes E_1 to E_n, respectively, the second groove O_j being opposite the electrode E_j, the distance between first groove G_j and the second groove O_j being greater than the thickness of the non-single-crystal semiconductor laminate member Q_j in the lateral direction;

forming on the substrate a second conductive layer continuously extending on the non-single-crystal semiconductor laminate members Q_1 to Q_n and into the grooves O_1 to O_{n-1} to provide coupling portions K_1 to K_{n-1} which are connected to the first electrodes E_1 to E_{n-1} through the grooves O_1 to O_{n-1}, respectively; and

forming (n−1) sequentially arrranged isolating portions H_1 to H_{n-1} in at least the second conductive layer using third laser beam to form therein n sequentially arranged second electrodes F_1 to F_n separated by the isolating portions H_1 to H_n and opposing the first electrodes E_1 to E_n through the non-single-crystal semiconductor laminate member Q_j, the distance between the second groove O_j and the isolating protion H_j being greater than the thickness of the non-single-crystal semiconductor laminate member Q_j in the same lateral direction in which the second groove O_j is spaced apart from the first groove G_j, the second electrode F_{j+1} being connected to the first electrode E_j through the coupling portion K_j.

4,710,398

SEMICONDUCTOR DEVICE AND MANUFACTURING METHOD THEREOF

Yoshio Homma, and Takashi Nishida, both of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

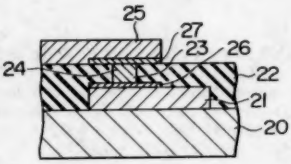
Filed Aug. 26, 1986, Ser. No. 900,523
Claims priority, application Japan, Sep. 6, 1985, 60-195837
Int. Cl.[4] H01L *21/285*
U.S. Cl. 437—235 **10 Claims**

1. A method of manufacturing a semiconductor device, comprising steps of:

forming an insulation film having an opening on a semiconductor substrate;

filling said opening with an electrically conductive material so as to substantially flatten the top end face of the filled opening;

forming an intermediate layer of an electrically conductive



material having a greater allowable current density than that of a wiring layer, said intermediate layer having a greater area than that of said opening so as to cover at least the surface of said electrically conductive material filling said opening; and

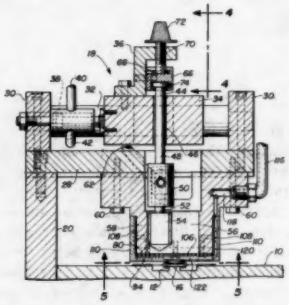
forming said wiring layer which extends from said intermediate layer onto said insulation film.

4,710,399

METHOD AND MECHANISM TO DEPOSIT SOLDER PASTE UPON SUBSTRATES

Richard K. Dennis, P.O. Box 2039, R.D. #2, Etters, Pa. 17319

Filed Sep. 2, 1986, Ser. No. 902,785
Int. Cl.[4] B05D *5/12*
U.S. Cl. 437—245 **20 Claims**



1. A method to deposit viscous solder paste upon a substrate of a semi-conductor device comprising the steps of:

a. positioning a substrate at a predetermined position to receive dots of paste in a desired pattern,

b. connecting a solder deposit head to a source of said paste maintained under predetermined pressure,

c. reciprocating said head between an elevated starting position spaced above said substrate and a depositing position immediately adjacent the substrate but spaced a limited distance thereabove,

d. exerting pressure upon paste within said head to effect discharge of paste through a die having a desired pattern of holes therein while said head is in said depositing position and similar columns of paste are discharging through said holes toward said substrate by said exerted pressure,

e. instantly effecting elevation of said head from said substrate when the discharging ends of said columns have engaged said substrate and adhered thereto and thereby cause separation of said columns from the adhered ends thereof on said substrate which comprise similar sized dots of said solder thereon, and

f. momentarily and immediately discontinuing said pressure

within said head upon initiating elevation of said head as aforesaid and thereby very briefly discontinue discharge movement of paste through said holes in said die and thereby enhance said separation of said dots from said columns of paste by said elevation of said head,

g. followed by removing said first mentioned substrate from its receiving position and advancing a succeeding substrate to said receiving position and repeating the above-described sequence of operations after restoring pressure to the paste in said head immediately following each discontinuance of pressure thereon.

4,710,400

CHEMICAL PROCESS FOR CONFERRING CONDUCTOR, ANTISTATIC AND FLAME-PROOFING PROPERTIES TO POROUS MATERIALS

Gian P. Gardini, Pilastro Di Parma, and Vittorio Bocchi, Parma, both of Italy, assignors to Universita' Degli Studi Di Parma, Parma, Italy

Filed Jun. 20, 1986, Ser. No. 876,846

Claims priority, application Italy, Jun. 21, 1985, 42507 A/85

Int. Cl.[4] B05D *3/02, 5/12*

U.S. Cl. 427—121 **14 Claims**

1. A process for the preparation of a thin film of a conductive, solid, microporous composite material comprising:

contacting one face of the composite material with a compound selected from pyrrole, N-methylpyrrole and 3,4-dimethylpyrrole until said material is impregnated with said compound;

contacting only the opposed face of the impregnated material with an oxidizing solution to thereby cause the compound to polymerize only on the opposed face of the impregnated material; and

washing the impregnated material having the pyrollic polymer on the opposed face to remove residual oxidizing solution.

4,710,401

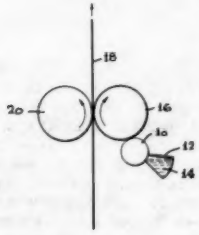
METHOD OF PRINTING ELECTRICALLY CONDUCTIVE IMAGES ON DIELECTRIC SUBSTRATES

Leslie F. Warren, Jr.; Louis Maus, both of Camarillo, and William F. Hall, Thousand Oaks, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 883,260, Jul. 8, 1986, and Ser. No. 916,917, Oct. 9, 1986. This application Feb. 9, 1987, Ser. No. 12,460

Int. Cl.[4] B05D *5/12, 5/00;* **C23C** *16/00*

U.S. Cl. 427—121 **25 Claims**



1. A process for generating electrically conductive patterns on a dielectric substrate which comprises:

applying to preselected areas of the substrate a preselected concentration of an ink consisting essentially of a suitable oxidizing agent capable of reacting with a pyrrole monomer to form a printed ink surface,

exposing the printed surface to a pyrrole monomer to form an electrically conductive polypyrrole material, and

developing conductive images in those areas of the printed ink surface of the substrate containing the oxidizing agent.

16. The process of claim 1, said substrate being a fabric selected from the group consisting of fiberglass fabric, mixed oxide fabric and a synthetic organic fabric.

4,710,402

METHOD OF MAKING FILTER PAPER

Sune Backman, Yngvevagen 6, Djursholm, S-182 64, and Hakan Hakanson, Strakvagen 54, Taby, S-183 40, both of Sweden

Filed Sep. 4, 1984, Ser. No. 646,726

Int. Cl.[4] B05D *5/00*

U.S. Cl. 427—244 **14 Claims**

1. A method for making filter paper for use in an edge-filtering system, comprising the steps of:

(a) soaking a filter paper in a liquified phenolic resin until the paper is saturated, said filter paper being a sheet;

(b) punching annular disks from said saturated sheet;

(c) applying heat and low pressure to said annular disks from said saturated sheet of filter paper, so that the resin hardens in close contact with the paper and its constituent fibers; and

(d) reducing the pressure applied to the annular disks at or just before hardening of the resins.

4,710,403

METALLIZED POLYMERS

Larry J. Krause, and Jack A. Rider, both of Stillwater, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 5, 1986, Ser. No. 859,471

Int. Cl.[4] B05D *3/10*

U.S. Cl. 427—304 **39 Claims**

1. A process for the deposition of metal layers onto at least one polymeric surface having electroactive sites therein comprising contacting said at least one polymeric surface with a first solution wherein at least 10 molar percent of all negative charge intercalation ions within said first solution are selected from the group consisting of monoatomic ions and complexed transition metals as negative charge intercalation ions and wherein the half-wave potential of said at least 10 molar percent of said negative charge intercalation ions is negative with respect to the half-wave potential of the electroactive sites in said polymer surface, thereby reducing the polymer of said at least one polymeric surface without substantial plating of metal onto said at least one polymeric surface, then contacting said at least one surface of the reduced polymer with a second solution having reducible metal cations therein so that the reduced polymer of said at least one polymeric surface reduces the metallic ion to form metal in a form selected from the group consisting of metal film on said at least one polymer surface and metal particles within said at least one polymer surface.

4,710,404

SOLVENT-FREE COATING COMPOSITION AND PROCESS FOR PROTECTING A SURFACE FROM CORROSION

William W. Reichert, Freehold; Charles A. Cody, East Windsor; Michael A. Desesa, Fair Haven, and Bruce K. Faulseit, Mount Holly, all of N.J., assignors to NL Chemicals, Inc., Hightstown, N.J.

Continuation-in-part of Ser. No. 753,456, Jul. 10, 1985, Pat. No. 4,615,918. This application Jul. 11, 1986, Ser. No. 884,635

Int. Cl.[4] B05D *3/02;* **C04B** *9/02;* **B66D** *3/04*

U.S. Cl. 427—386 **45 Claims**

36. A process for protecting a surface from corrosion comprising:

(a) coating the surface with a solvent-free coating composition comprising

(i) a solvent-free coating material; and

(ii) a non-pigmentary anti-corrosive agent comprised of a calcined mixture consisting essentially of from about 5

to about 95% by weight of magnesium oxide and from about 5 to about 95% by weight of zinc oxide; and

(b) permitting the coating composition to harden.

4,710,405

ADHESION OF SILICONE ELASTOMERS OBTAINED FROM AQUEOUS EMULSION

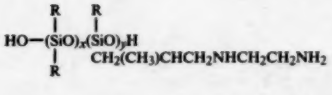
Daniel Graiver, Midland, and Robert E. Kalinowski, Auburn, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Aug. 25, 1986, Ser. No. 899,847
Int. Cl.[4] B05D *5/10*
U.S. Cl. 427—387 6 Claims

1. A method of improving the adhesion of silicone elastomers, obtained from aqueous emulsion, to substrates comprising mixing

(A) an anionically polymerized polydiorganosiloxane, in the form of an emulsion that cures into a silicone elastomer upon removal of the water, and

(B) an amine functional polydiorganosiloxane co-oligomer of the formula



where R is a monovalent alkyl radical of from 1 to 6 carbon atoms, x is from 1 to 250, and y is from 2 to 50, then applying the mixture to a substrate and allowing to dry, to give a silicone elastomer adhered to the substrate in a cohesive manner.

4,710,406

RESIN FOR A SIZING COMPOSITION, A PROCESS FOR ITS PREPARATION AND THE SIZING COMPOSITION OBTAINED

Roger Fugier, Rantigny; Charles de Goys de Mezerac, Gifes sur Yvette, both of France; Jacky Joachim, Berwyn, Pa., and Michel Decagny, Clermont, France, assignors to Isover Saint-Gobain, Aubervilliers, France

Division of Ser. No. 672,909, Nov. 19, 1984, Pat. No. 4,663,419. This application Jan. 20, 1987, Ser. No. 4,425
Claims priority, application France, Nov. 29, 1983, 83 19017
Int. Cl.[4] C08G *14/08*
U.S. Cl. 427—389.8 9 Claims

1. A composition of matter consisting essentially of a phenol formaldehyde and urea condensate for use in a sizing composition for mineral fibers wherein the phenol and formaldehyde are condensed by (a), heating together a preliminary mixture of phenol and formaldehyde at a temperature of about 45° C., the molar ratio F/P of formaldehyde to phenol being between 3 and 6 (b), raising the temperature up to between Ca 60° C. and 75° C. and thereby reacting phenol and formaldehyde after addition of a basic catalyst in an amount of 12 to 20 moles of hydroxyl equivalent for 100 moles of initial phenol, and maintaining this temperature until the phenol conversion rate is above 98% (c) cooling the reaction medium and introducing urea into the reaction medium, the molar ratio U/P of urea to initial phenol being between (F/P−2.55/2.6) and (F/P−2.55/0.7), said condensate being a liquid and having a free phenol content below 0.5%, a free formaldehyde content below 3% expressed by weight based on the total weight of liquid, a water tolerance measured at 20° C. of at least equal to 1000%, a storage stability of at least 15 days and a dry extract content of at least equal to 40%.

4,710,407

METHOD FOR PRESERVING FISHING NETS

Richard L. Keeton, P.O. Drawer 125, Taft, Tex. 78390-0125

Filed Dec. 10, 1985, Ser. No. 807,286
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—389.9 10 Claims

1. A process for treating a fishing net to increase durability which comprises:

preparing a mixture of a urethane alkyd resin and a thinning agent;

contacting a fishing net with said mixture; and

drying said fishing net.

4,710,408

PRIMER COATING FOR CYCLOOLEFIN POLYMER ARTICLES

Wayne A. Kraus, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jul. 11, 1986, Ser. No. 884,821
Int. Cl.[4] B05D *3/02;* C08L *61/02*
U.S. Cl. 427—393.5 14 Claims

6. A process for preventing staining of painted cycloolefin polymer articles comprising applying a primer coating composition to the articles, said composition comprising

(a) from about 8% to about 46% alkyd resin,

(b) from about 3% to about 18% urea-formaldehyde resin,

(c) from about 25% to about 83% of at least on 2–4 carbon alkanol,

(d) from about 1.5% to about 24% nonleafing aluminum pigment, and

(e) from about 0.5% to about 3.5% of an acid catalyst,

and then causing the composition to cross-link before painting.

4,710,409

CONTROLLING AND REDUCING OPENING TORQUES OF CAPS AND LIDS

Marcel Lahaye, La Reid, Belgium, assignor to Spadel S.A., Brussels, Belgium

Filed Apr. 10, 1986, Ser. No. 850,243
Claims priority, application United Kingdom, Apr. 16, 1985, 8509745
Int. Cl.[4] B05D *1/02*
U.S. Cl. 427—421 11 Claims

1. A method of reducing opening torques of caps and lids on containers comprising covering the sliding surface of said caps or lids and/or of the finish of the containers prior to closure with an appropriate lubricant applied by contacting the sliding surface of the caps or lids and/or of the finish of the containers prior to closure with a lubricating formulation containing from 0.001 to 10% by volume of the lubricant in the appropriate diluent.

4,710,410

DUAL BASKET SMALL PARTS COATING APPARATUS

Michael J. Narusch, Jr., 5131 Skylite La., Utica, Mich. 48087

Filed Nov. 26, 1986, Ser. No. 935,015
Int. Cl.[4] B05D *1/18;* B05C *3/00, 19/02*
U.S. Cl. 427—430.1 12 Claims

8. The improvement in the method of applying a fluid coating composition to parts processed in coating equipment which includes a perforate, rotatable basket, where parts are loaded to a basket, the basket is contacted with coating composition and rotated therein to provide intimate contact between parts and coating composition, and coated parts are discharged from said basket, the improvement comprising;

establishing a path of travel for said parts, which path includes a direction of movement for uncoated parts to be charged to a basket, as well as a direction of movement for coated parts discharging from a basket;

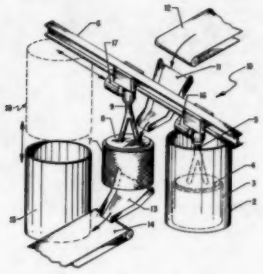
providing a basket loading/unloading zone in said path of travel;

establishing a line of travel for a first and second basket,

which line intersects said parts path of travel at said loading/unloading zone and extends there through from a first basket coating zone to a second basket coating zone;

supplying parts to be coated to a first basket at said loading-/unloading zone while said second basket is located at its coating zone;

shuttling the resulting loaded first basket from said loading-



/unloading zone along the basket line of travel to the first basket coating zone; while at the same time

shuttling the second basket along the basket path of travel from its coating zone to the basket loading/unloading zone; and

unloading said second basket at the loading/unloading zone, while subsequently loading same, and while at that time coating parts in said first basket located at its coating zone.

4,710,411

COMPATIBLE BEDDING COMPOUND FOR ORGANICALLY SEALED INSULATING GLASS

Michael J. Gerace, Kettering; Gary D. Krysiak, Englewood, and Russell F. Schiappacasse, Dayton, all of Ohio, assignors to Protective Treatments, Inc., Dayton, Ohio

Division of Ser. No. 741,522, Jun. 5, 1985. This application Nov. 14, 1986, Ser. No. 930,680

Int. Cl.[4] E06B *3/24*

U.S. Cl. 428—34 **6 Claims**

1. A method of sealing an insulated glass unit to a frame comprising the steps of applying a bedding composition to said frame; said bedding composition being compatible with the sealant used to form said insulated glass unit and comprising a polar solvent or mixture of polar solvents which are substantially insoluble with nonpolar hydrocarbons, a plasticizer selected from the group consisting of a polar plasticizer containing at least one noncarbon/hydrogen functional group, a polymeric plasticizer, and mixtures thereof, and an elastomer compatible with said polar solvent and said plasticizer; and sealing said insulated glass unit against said bedding compound and said frame.

4,710,412

MANUFACTURE OF FRAMES

Jean-Louis Darrieux, Merignac, France, assignor to Societe Nationale Industrielle et Aerospatiale, Paris, France

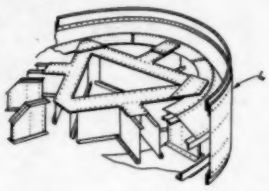
Filed May 29, 1985, Ser. No. 739,266

Claims priority, application France, May 30, 1984, 84 08524

Int. Cl.[4] B27N *5/02*; B64D *27/00, 41/00*

U.S. Cl. 428—36 **1 Claim**

1. A composite frame having a longitudinal axis of symmetry and comprising an outer sleeve coaxial with said axis, an assembly of elongate elements disposed substantially perpendicularly to the said axis, an annular casing anchoring said elongate elements to said outer sleeve, and reinforced elements connecting the beams together, said sleeve, said casing and said elements being hollow and being formed from filamentary material impregnated with hardenable resin, said casing comprising two axial halves bonded together end to end and each including a cylindrical flange portion concentric with said axis, said elongate and reinforcing elements being disposed within and



bonded to said halves of the casing, and said outer sleeve being formed about said cylindrical flange portions.

4,710,413

COATING COMPOSITION AND ITS USE FOR THE PREPARATION OF OXYGEN BARRIER COATINGS ON PLASTIC ARTICLES

Wolfgang Quack, Mettman, Fed. Rep. of Germany, assignor to Dow Chemical Handels-und Vertriebsgesellschaft mbH, Midland, Mich.

Division of Ser. No. 653,397, Sep. 24, 1984, abandoned. This application Jul. 29, 1985, Ser. No. 760,235

Int. Cl.[4] C08F *8/00*; C08L *27/00*

U.S. Cl. 428—36 **9 Claims**

1. A method for reducing the oxygen permeability of a plastic pipe by coating the plastic pipe with a coating composition comprising from 75 to 95 weight percent of a thermoplastic vinylidene chloride copolymer and 25 to 5 weight percent of a thermoplastic polyester urethane having a Shore A hardness of 80 to 90 derived from (1) a polyester polyol which comprises (a) a condensation product of a saturated aliphatic diol and a saturated aliphatic dicarboxylic acid, (b) a condensation product of a saturated aliphatic lactone, or (c) mixtures of (a) and (b); and (2) an aromatic diisocyanate, whereby the percentages refer to the total weight of the copolymer and the polyester urethane.

4,710,414

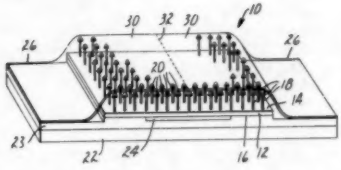
FASTENER ASSEMBLY WITH HEAT SHRINKABLE FILM COVER

Walter E. Northrup, and Maurice E. Freeman, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jul. 10, 1984, Ser. No. 629,331

Int. Cl.[4] A44B *21/00*

U.S. Cl. 428—43 **3 Claims**



1. In an elongate fastener assembly comprising a backing strip having first and second major surfaces;

a multiplicity of stems each secured at one end to said backing strip, projecting generally normally to the first surface of said backing strip, and having enlarged heads at their ends opposite said backing strip adapted to engage loops on materials pressed against said heads;

an open porous permanent attachment layer attached to the secnod major surface of said backing strip, said permanent

attachment layer having sufficient open areas to afford movement of foam into said permanent attachment layer to permanently attach said fastener assembly to a foamed article; and

an elongate film cover means overlaying the heads and having longitudinal edge parts attached along the longitudinal edges of said backing, said film cover means being adapted to expose said heads upon the application of heat;

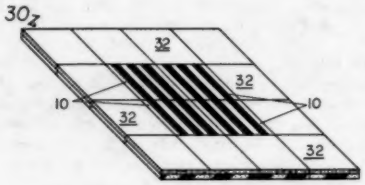
the improvement wherein said film cover means comprises two longitudinal portions, said portions being sufficiently heat shrinkable in the transverse direction that upon application of said heat each of said portions will shrink towards a different one of said edge parts while remaining in one piece to expose said heads.

4,710,415

REINFORCED FOAM ANTI-FATIGUE FLOOR TILE MODULE AND METHOD OF MAKING SAME

David K. Slosberg, Atlanta, and Gilbert S. Nowell, Marietta, both of Ga., assignors to Compo Industries, Inc., Waltham, Mass.

Filed Sep. 11, 1986, Ser. No. 906,223
Int. Cl.[4] B32B *3/30, 5/14, 5/20;* **B05D** *3/02*
U.S. Cl. 428—48 **33 Claims**



1. A reinforced vinyl-foam, anti fatigue floor module of defined dimensions, which comprises:

(a) a resilient, substantially closed cell, vinyl-foam layer of sufficient thickness to provide anti-fatigue cushioning properties, said layer having a face surface and a back surface, the foam layer having a density of about 20 pounds per cubic foot or more, and one surface having an embossed, anti-friction or design pattern thereon; and

(b) a reinforcing fibrous sheet material within the foam layer and positioned between 55% to 65% of the depth of the foam layer from the non-embossed surface to provide a dimensionally stable floor module characterized by laying flat on a floor surface and which has a shrinkage of less than about two-tenths of one percent on aging.

10. A floor covering system which comprises a floor surface covered by a plurality of the anti-fatigue floor modules of claim **1** the floor modules adjoining each other in a close, edge-to-edge matching floor covering relationship.

11. The floor covering system of claim **10** in which modules are a plurality of fibrous-face carpet tiles, the carpet tiles and floor modules, adjoining each other in a close, edge-to-edge matching floor covering relationship.

4,710,416

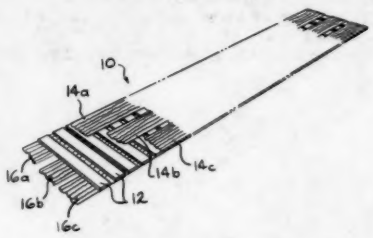
CORE STRUCTURE FOR USE IN A SEAL

Russell W. Barth, Upper Sandusky, and Ronald P. Buess, Wharton, both of Ohio, assignors to Uni-Grip, Inc., Upper Sandusky, Ohio

Filed Apr. 8, 1985, Ser. No. 721,233
Int. Cl.[4] B32B *7/00*
U.S. Cl. 428—119 **3 Claims**

1. A core structure for use in a seal assembly, trim assembly, and the like, comprising:

a plurality of individual core segments of resilient material positioned in spaced apart relationship to one another, and at least one strip of flexible substantially inextensible adhesive tape adhered to and extending along one surface of each of said segments, said segments being coupled together only by said tape strips, each of said tape strips



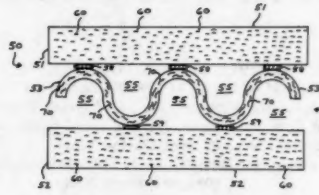
extending in a direction perpendicular to the length of each said segment and being substantially narrower than the length of each said segment.

4,710,417

PAPERBOARD PANEL CONSTRUCTION

Thomas L. Cline, Hanover, Pa., assignor to Corra-Board Products Co., Inc., Hanover, Pa.

Filed Sep. 26, 1986, Ser. No. 911,727
The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.
Int. Cl.[4] B32B *3/12*
U.S. Cl. 428—182 **1 Claim**



1. A paperboard panel construction (**50**), said paperboard panel structure (**50**) having an overlayer (**51**) comprised of chipboard material having relatively shorter fiber lengths (**60**) contained therein,

said paperboard panel structure having an underlayer (**52**) comprised of chipboard material having relatively shorter fiber lengths (**60**) contained therein,

said paperboard panel structure further having an undulating midstratum layer (**53**) between said overlayer (**51**) and underlayer (**52**),

wherein the upper undulation portions of said midstratum layer (**53**) are secured directly to said overlayer (**51**) by adhesive means (**58**),

and wherein the lower undulation portions of said midstratum layer (**53**) are secured directly to said underlayer (**52**) by adhesive means (**59**),

said paperboard panel structure providing means wherein air cells (**55**) are formed internally thereof such that a given panel caliper or thickness may be maintained while reducing the number of chipboard layers required for construction,

wherein said undulating midstratum layer (**53**) has relatively longer fiber lengths (**70**) contained therein as compared to the relatively shorter fiber lengths (**60**) contained in said overlayer (**51**) and said underlayer (**52**),

wherein the average fiber length (**60**) of said overlayer (**51**) and said underlayer (**52**) is two millimeters or less,

wherein the average fiber length (**70**) of said undulating midstratum layer (**53**) is five millimeters or more,

wherein said air cells (**55**) are formed between said overlayer

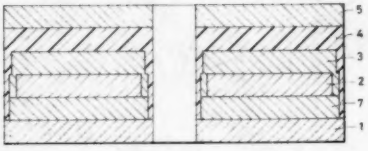
(51) and said underlayer (52) by way of said undulating midstratum layer (53) such that the overall weight of a panel (50) is reduced while improving panel strength via the spring-like effect of said midstratum layer and by the relatively longer fiber lengths (70) contained in said midstratum layer.

4,710,418

OPTICAL RECORDING MEDIUM

Katsuhiko Takano, Yokohama; Satoshi Yoshihara; Shigeharu Iijima, both of Kawasaki; Eizo Sasamori, Yokohama; Masaaki Matsushima, Machida, and Hiroyoshi Kishi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 623,474, Jun. 22, 1984, abandoned. This application Feb. 2, 1987, Ser. No. 9,545
Claims priority, application Japan, Jun. 29, 1983, 58-116157
Int. Cl.[4] B32B 7/12, 15/04; G01D 9/00
U.S. Cl. 428—192 6 Claims



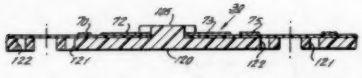
1. An optical recording medium, wherein a plurality of layers including an optical recording layer are laminated on the substrate, characterized in that said substrate has a region on and around the edge portion thereof where no optical recording layer is formed, and that said region is sealed by one or more remaining layers other than said optical layer, the remaining layer or layers comprising a thin film of a metal, Si or a compound thereof.

4,710,419

IN-MOLD PROCESS FOR FABRICATION OF MOLDED PLASTIC PRINTED CIRCUIT BOARDS

Vernon C. Gregory, 239 W. Myrna La., Tempe, Ariz. 85284

Division of Ser. No. 631,209, Jul. 16, 1984, Pat. No. 4,584,767. This application Mar. 21, 1986, Ser. No. 842,183
Int. Cl.[4] B32B 3/00; H05K 1/00; G03C 5/00; B44C 1/22
U.S. Cl. 428—210 7 Claims



1. A molded printed circuit board comprising a generally flat molded body portion of electrical insulation material having top and bottom generally parallel surfaces; a conductive patterned foil disposed atop said top surface and firmly adherent thereto; and at least one molded projection of electrical insulation material integrally joined to said molded body portion, extending from said flat molded body portion and above the plane of the surface of said conductive patterned foil, and having its sides free of conductive material; said projection extending from an area of said molded body which is spaced inwardly from the periphery of said molded body.

4,710,420

UNSATURATED POLYESTER RESIN COMPOSITIONS

Satoshi Tonoki, Suita; Hidenari Tsunemi, Ohtsu; Asaichi Nishimura, Ohtsu, and Kunihisa Abe, Ohtsu, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 20, 1985, Ser. No. 811,860
Claims priority, application Japan, Dec. 21, 1984, 59-271389; Dec. 21, 1984, 59-271390
Int. Cl.[4] B32B 7/02, 27/08; C08F 8/00
U.S. Cl. 428—212 30 Claims

1. An unsaturated polyester resin composition comprising a hard unsaturated polyester component, a soft unsaturated polyester component and a cross-linking monomer, said soft polyester component containing a polyoxyalkylene segment having a molecular weight from 600 to 6000 in the backbone thereof and being dispersed in said hard polyester component forming fine particles having a particle size not greater than 0.4 microns, said resin composition exhibiting in its cured state a glass transition temperature corresponding to said hard polyester component from 100° C. to 200° C. and another glass transition temperature corresponding to said soft polyester component from −100° C. to 0° C.

14. An electrical laminate comprising at least two layers of a fibrous substrate impregnated with the resin composition of claim 1.

4,710,421

MAGNETIC RECORDING MEDIUM

Toshio Ono; Yasuo Tamai; Chiaki Mizuno; Hiroshi Ogawa, and Shinji Saito, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 24, 1987, Ser. No. 29,557
Claims priority, application Japan, Mar. 24, 1986, 61-65315
Int. Cl.[4] G11B 5/70
U.S. Cl. 428—213 7 Claims

1. A magnetic recording medium having a heat shrinkage ratio of not higher than 1% and comprising a nonmagnetic support in the form of a tape which has a heat shrinkage ratio of not higher than 1.8%, a Young's modulus of 450 to 650 kg/mm^2 in the longitudinal direction and a Young's modulus of 450 to 550 kg/mm^2 in the width direction, and a magnetic recording layer provided on the support which comprises a binder and a ferromagnetic powder dispersed therein and has a squareness ratio of not less than 0.89, all the heat shrinkage ratios being determined after being allowed to stand at 110° C. for 4 hours.

4,710,422

PROCESS FOR THE TREATMENT OF A FIBROUS SHEET OBTAINED BY PAPERMAKING PROCESS, WITH A VIEW TO IMPROVING ITS DIMENSIONAL STABILITY, AND APPLICATION OF SAID PROCESS TO THE FIELD OF FLOOR AND WALL-COVERINGS

Pierre Fredenucci, Charavines, France, assignor to Arjomari-Prioux, Paris, France

Filed Jan. 16, 1986, Ser. No. 819,349
Claims priority, application France, Jan. 18, 1985, 85 00745
Int. Cl.[4] B32B 7/00; B05D 3/02
U.S. Cl. 428—248 4 Claims

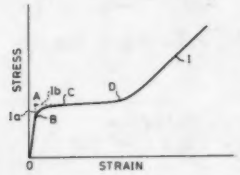
4. A floor or wall covering support formed from a fibrous sheet containing cellulosic fibers obtained by a papermaking process which comprises impregnating said sheet with a chemical composition containing at least one wetting agent select from the group consisting of polyglycols and derivatives thereof, and at least one organic binder selected from the group consisting of SBR, acrylic and PVC polymers, vinyl-acetate-vinylchloride-ethylene terpolymers, starch, polyvinylic alcohols, and polyamide-polyamine-epichlorhydrin resins.

4,710,423

WOVEN POLYESTER WEBBING FOR SAFETY BELTS

Tosuke Imamura, Nara, Japan, assignor to Teijin Limited, Osaka, Japan

Filed Nov. 10, 1986, Ser. No. 929,638
Claims priority, application Japan, Nov. 11, 1985, 60-250639
Int. Cl.[4] D03D *15/00*
U.S. Cl. 428—272 5 Claims



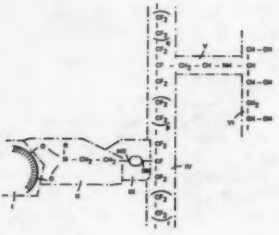
1. A webbing useful for safety belts comprising a woven belt composed of warps and wefts, and characterized in that at least the warps consist of polyester filament yarns having an intrinsic viscosity of 0.7 or more, a birefringence of from 0.08 to 0.15, a tensile strength of 4 g/denier or more, an ultimate elongation of from 50% to 80% and an elongation of 5% or less at a point A in a tensile stress-strain curve of the yarns, which point A denotes an intersecting point of an extension line from a steeply sloped portion of the curve appearing at an initial stage of the elongation of the yarns with an extension line from a substantially horizontal or slightly sloped portion of the curve appearing at an middle stage of the elongation of the yarns.

4,710,424

MAGNETIC DISK AND METHOD OF MAKING SAME

Upali Bandara, Stuttgart; Holger Hinkel; Werner Steiner, both of Boeblingen, and Gerhard Trippel, Sindelfingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 24, 1985, Ser. No. 790,710
Claims priority, application European Pat. Off., Oct. 31, 1984, 84113054.5
Int. Cl.[4] G11B *5/708*
U.S. Cl. 428—325 3 Claims



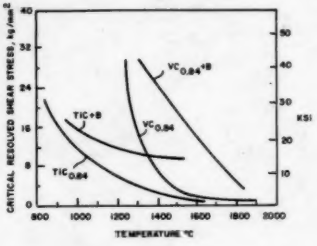
1. A magnetic disk having a magnetic layer applied on a substrate and comprising a binder, magnetic particles, and particles of an abrasion-resistant material, characterized in that the abrasion-resistant particles are of diameter smaller than the thickness of the magnetic layer, and comprise hard ceramic material coated with an enveloping layer, and in that the enveloping layer comprises a material selected from the group consisting of SiO_2/Al_2O_3 and poly(tetrafluorethylene, and is between 1 and 100 nanometers thick, and further characterized in that the abrasion-resistant particles are coated prior to being dispersed in the binder and in that said coating and said enveloping layer intensify the bonding of said abrasion-resistant particles with the binder.

4,710,425

ABRASION RESISTANT ARTICLES AND COMPOSITION UTILIZING A BORON-DOPED REFRACTORY PARTICLE

J. Gary Baldoni, II, Walpole; Sergej-Tomislav Buljan, Acton, and Vinod K. Sarin, Lexington, all of Mass., assignors to GTE Laboratories Inc., Waltham, Mass.

Filed Dec. 17, 1985, Ser. No. 809,939
Int. Cl.[4] B32B *9/00;* C04B *35/58;* B24D *3/34*
U.S. Cl. 428—328 19 Claims



1. An improved abrasion resistant composition consisting essentially of a densified ceramic matrix having dispersed therein, at least one refractory dispersoid doped with boron, said refractory dispersoid having an average particle size below about 20 μm.

4,710,426

SOLAR RADIATION-CONTROL ARTICLES WITH PROTECTIVE OVERLAYER

Robert K. Stephens, Windham, N.H., assignor to Polaroid Corporation, Patent Dept., Cambridge, Mass.

Filed Nov. 28, 1983, Ser. No. 555,520
Int. Cl.[4] B32B *15/08, 27/06, 27/36*
U.S. Cl. 428—336 28 Claims

1. A radiation-control sheet material comprising: a transparent support carrying means for reflecting infrared radiation; and as a protective outer layer for said radiation-control sheet material, a polymeric layer substantially transmissive of infrared radiation, said polymeric layer having therein or as a layer contiguous thereto an effective amount of an isocyanate adhesion-promoting agent.

2. The radiation-control sheet material of claim 1 wherein said protective outer layer has a physical thickness of about 0.08 micron to about 25 microns.

4,710,427

PROCESS FOR TREATING MAGNETIC METAL POWER

Yasuhisa Yamauchi; Masao Asano; Hideyuki Anzai, and Yoshitaka Yasufuku, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

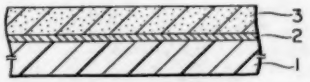
Filed May 6, 1985, Ser. No. 731,126

Claims priority, application Japan, May 17, 1984, 59-98981

The portion of the term of this patent subsequent to Dec. 31, 2002, has been disclaimed.

Int. Cl.[4] G11B *5/706*

U.S. Cl. 428—407 17 Claims



1. A process for treating a magnetic metal powder comprising

(a) treating the surface of said magnetic metal powder with an alkylamine fatty acid,

(b) then steeping said magnetic powder in an organic liquid, and

(c) then drying said magnetic powder in the presence of an oxidative gas.

4,710,428

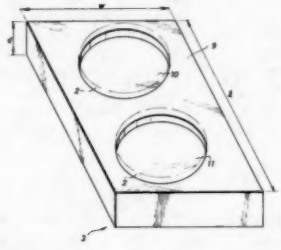
SINTERED SILICON CARBIDE POROUS BODY IMPREGNATED WITH METALLIC SILICON

Teruyasu Tamamizu, Sagamihara; Kichihei Sato; Takashi Tanaka, both of Oguni, and Shunkichi Sato, Sekikawa, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo, Japan

Filed Mar. 10, 1986, Ser. No. 837,821

Int. Cl.[4] B32B *9/00*

U.S. Cl. 428—408 10 Claims



1. A susceptor for use in an in-line deposition of a coating on a silicon wafer by a CVD process, comprising Si-SiC ceramic comprising a sintered body of SiC with pores therein impregnated with from about 7% to 25% by weight of metallic silicon of high purity.

4,710,429

LAMINATES FROM EPOXIDIZED PHENOL-HYDROCARBON ADDUCTS

Gary W. Bogan, Lake Jackson, Tex.; Peter A. Lucas, Allentown, Pa.; Georgia A. Monnerat, and Dale J. Aldrich, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 827,989, Feb. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 723,392, Apr. 15, 1985, abandoned. This application Jan. 20, 1987, Ser. No. 4,986

Int. Cl.[4] C08G *59/04, 59/32*

U.S. Cl. 428—417 12 Claims

1. In a laminate having a Tg of at least about 150° C. prepared from a cured composition comprising

(A) at least one reinforcing material;

(B) at least one epoxy resin; and

(C) at least one curing agent for component (B);

the improvement which comprises employing as at least a part of component (B) at least one hydrocarbon-phenol epoxy resin, halogenated hydrocarbon-phenol epoxy resin or combination thereof in an amount such that at least about 40 percent of the epoxy groups present in component (B) are contributed by said hydrocarbonphenol epoxy resin or halogenated hydrocarbonphenol epoxy resin.

4,710,430

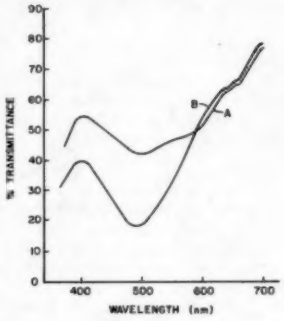
COLORED PHOTOCHROMIC GLASSES AND METHOD

Nicholas F. Borrelli, Elmira; George B. Hares, Corning; Dennis W. Smith, Corning, and Brent M. Wedding, Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 650,846, Sep. 17, 1984, Pat. No. 4,537,612, which is a continuation-in-part of Ser. No. 364,472, Apr. 1, 1982, abandoned. This application May 3, 1985, Ser. No. 729,965

Int. Cl.[4] C03C *4/06*

U.S. Cl. 428—432 2 Claims



1. A photochromic glass article which has silver halide as the photochromic agent, which contains at least 1% by weight Li_2O, at least 2% by weight Na_2O, and at least 6% by weight $Li_2O+Na_2O+K_2O$, and which has a surface permanent coloration zone, said surface coloration zone consisting of a first layer of coloration overlying a second layer of different coloration, said first layer having an absorption peak at a longer wavelength than said second layer, at least said first layer exhibiting an absorption band between about 510–580 nm.

4,710,431

MAGNETOOPTICAL RECORDING ELEMENT AND A MAGNETOOPTICAL RECORDING DEVICE

Petrus P. J. Van Engelen, and Kurt H. J. Buschow, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 10, 1986, Ser. No. 928,953

Claims priority, application Netherlands, Mar. 13, 1986, 8600647

Int. Cl.[4] G11B *7/24*

U.S. Cl. 428—457 8 Claims

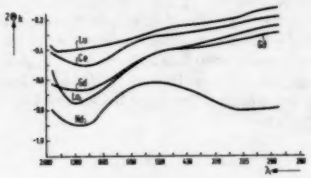
1. A magnetooptical recording element comprising:

a substrate;

a thin recording layer on the substrate; and

a heading means on the substrate for providing information for controlling the recording of information onto the recording element.

characterized in that the recording layer consists essentially of a crystalline alloy having the composition $R_2T_{14}B$,



where R is one or more rare-earth metals, T is one or more transition metals, and B is boron.

4,710,432

BASE MATERIAL FOR HONEYCOMB CORE STRUCTURE AND PROCESS FOR PRODUCING THE SAME

Kunio Nishimura, and Tadashi Hirakawa, both of Ibaraki, Japan, assignors to Teijin Limited, Osaka, Japan

Filed May 19, 1986, Ser. No. 865,210
Claims priority, application Japan, Aug. 8, 1985, 60-173108
Int. Cl.[4] B32B *3/12*
U.S. Cl. 428—542.8 **8 Claims**

1. A base material for a honeycomb core structure comprising a paper-like polyester fiber sheet which comprises 20% to 80% by weight of drawn polyester staple fibers, the drawn polyester staple fibers having a flat cross-sectional profile with a major axis and a minor axis and

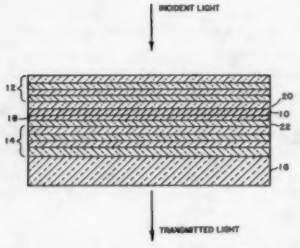
---

4,710,433

TRANSPARENT CONDUCTIVE WINDOWS, COATINGS, AND METHOD OF MANUFACTURE

James M. Rowe, Torrance, and Rudolph W. Modster, Los Angeles, both of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Filed Jul. 9, 1986, Ser. No. 883,897
Int. Cl.[4] B21D *39/00*
U.S. Cl. 428—623 **29 Claims**



1. An electrically conductive window having high optical transparency in the infrared, visible, or UV bands comprising

a substrate having at lease one smooth contiuous surface on one side thereof,

an intermediate dielectric impedance matching stack dsposited on said substrate surface,

a first difusion barrier layer deposited on said intermediate matching stack,

a nucleating layer deposited on said first barrier layer,

a conductive metal layer deposited on said nucleating layer in a film of continuous uniform thickness of about 10 nm or lesss with optical constants n, k,

said nucleating layer being selected to cooparate with said metal layer to allow the metal layer to form in a continuous thin film without agglomeration having optical constants n, k approximating these of the bulk metal and with a low sheet resistance,

said intermediate stack forming an impedance match between said substrate and said conductive layer,

a second diffusion barrier layer deposited on said metal layer, and

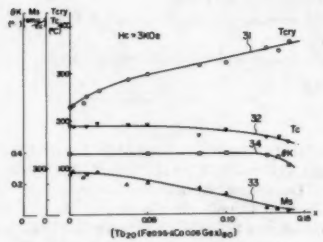
an outer dieletric anti-reflection stack deposited on said second barrier layer to form an impedance match between said conductive layer and air.

4,710,434

OPTOMAGNETIC RECORDING MEDIUM

Noboru Sato, Kanagawa; Kazutaka Habu, Tokyo, and Sanae Abe, Chiba, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 16, 1985, Ser. No. 808,991
Claims priority, application Japan, Dec. 17, 1984, 59-265640
Int. Cl.[4] G11B *7/24*
U.S. Cl. 428—678 **6 Claims**



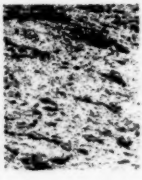
1. An optomagnetic recording medium comprising a non-magnetic base and a recording layer on said base having an overall composition of from 15 to 35 atomic % of at least one of the metals Gd, Tb, and Dy, with the remainder being composed of a mixture of Fe, Co, and Ge, said mixture containing 1 to 14 atomic % Ge, 5 to 10 atomic % Co and the balance essentially Fe, said recording layer being formed of alternately superposed layers in which some of said layers are enriched with at least one of said metals Gd, Tb, and Dy, and the others of said layers being enriched with said mixture of Fe, Co, and Ge.

4,710,435

METHOD FOR PRODUCTION OF SINTERED COMPOSITE HAVING SPINEL REINFORCED WITH SHORT FIBERS OF SILICON CARBIDE AND SINTERED COMPOSITE PRODUCED BY SAID METHOD

Kikuo Nakano, and Hiroshi Hayashi, both of Aichi, Japan, assignors to Agency of Industrial Science & Technology and Ministry of International Trade & Industry, both of Tokyo, Japan

Filed Oct. 31, 1986, Ser. No. 925,560
Claims priority, application Japan, Nov. 18, 1985, 60-258333
Int. Cl.[4] C04B *35/56*
U.S. Cl. 428—698 **2 Claims**



1. A sintered composite having spinel reinforced with short

fibers of silicon carbide, which comprises a spinel matrix containing MgO and Al_2O_3 in a molar ratio in the range of 1:1 to 1:1.3 and 10 to 30% by weight, based on said spinel matrix, of short fibers of silicon carbide having an average diameter in the range of 0.5 to 2 microns and a length in the range of 5 to 100 microns.

4,710,436

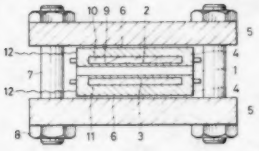
MOLTEN CARBONATE FUEL CELL AND METHOD OF MANUFACTURING ELECTROLYTE PLATE THEREOF

Junji Nakamura; Ikuma Nishimura; Goro Saito, all of Tokyo, and Kozo Matsumoto, Kanagawa, all of Japan, assignors to Toppan Printing Co., Ltd and Fuji Electric Co., Ltd., both of, Japan

Continuation-in-part of Ser. No. 716,421. Mar. 27, 1985, abandoned. This application May 14, 1986, Ser. No. 867,406

Int. Cl.[4] H01M *8/14*

U.S. Cl. 429—41 **10 Claims**



1. A molten carbonate fuel cell comprising a porous anode plate; a fuel gas chamber defined on one surface of said anode plate and adapted to supply fuel gas to said one surface of said anode: a porous cathode plate; an oxidation agent chamber defined on one surface of said cathode plate and adapted to supply an oxidation agent to said one surface of said cathode plate; a sintered porous ceramic plate disposed in between the other surface of said anode plate and the other surface of said cathode plate in intimate contact therewith, said porous ceramic plate being formed with a number of fine continuous pores having diameters distributed in a range from 0.05 μm to 10 μm, at least 60% of said fine pores having diameters distributed in a range from 0.05 μm to 0.5 μm, said fine pores having an average diameter of not more than 0.2 μm to provide a porosity of 50–70%, said fine pores communicating one surface of said ceramic plate with the other; molten carbonate electrolyte that fills said fine pores of said sintered porous ceramic plate; and means for continuously supplying fuel gas and oxidizing agent to said fuel gas chamber and said oxidizing agent chamber, respectively.

4,710,437

HIGH RATE METAL OXYHALIDE CELLS

Narayan Doddapaneni, Glenside, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

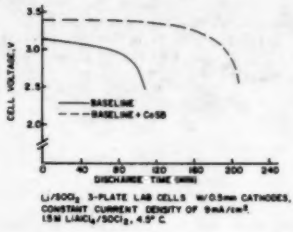
Continuation of Ser. No. 652,362, Sep. 19, 1984. This application Jan. 13, 1986, Ser. No. 818,072

Int. Cl.[4] H01M *10/36*

U.S. Cl. 429—101 **6 Claims**

1. In an non-aqueous electrochemical cell system having an active metal anode, a cathode and a non-aqueous electrolyte having an oxyhalide depolarizer, the improvement comprising:

a catalyst for the reduction of said oxyhalide depolarizer comprising a metal complex of Schiff's base, said Schiff's base being selected from the group consisting of macrocyclic complexes of 5-methyl isophthalaldehyde and 1,3-diaminopropane wherein the metal in said metal complex



is selected from the group consisting of iron and cobalt and wherein said metal complex is binuclear.

4,710,438

ACTIVATABLE BATTERY

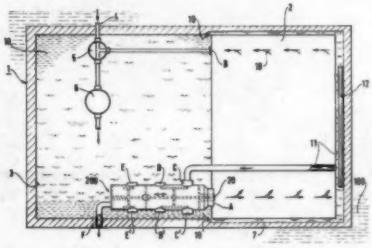
Yannick Leben, Bobigny, and Louis D'Ussel, Paris, both of France, assignors to SAFT, S.A., Romainville, France

Filed Jan. 13, 1987, Ser. No. 2,985

Claims priority, application France, Oct. 23, 1986, 86 14712

Int. Cl.[4] H01M *6/34*

U.S. Cl. 429—119 **6 Claims**



1. A battery activatable by seawater and comprising an electrochemical block implementing AgO/Al couples and having an inlet and an outlet for an electrolyte distribution circuit for distributing a sodium hydroxide-based electrolyte, and said electrolyte distribution circuit which comprises:

an inlet for seawater;

a pump for pumping the electrolyte;

a tank for electrolyte in solution, said tank having a first outlet which is directly connected to a first inlet to a thermostatic valve, and having a second outlet which is connected to a second inlet of said thermostatic valve via a heat exchanger, the outlet from said thermostatic valve being connected to said inlet to said electrochemical block;

an exhaust outlet for hot electrolyte containing aluminates and controlled by a valve which is controlled as a function of a parameter that varies with the rate of aluminate generation; and

means for regenerating the electrolytes, said means comprising a block of solid sodium hydroxide disposed in the cold electrolyte in the vicinity of the outlet from said heat exchanger.

4,710,439

SECONDARY LITHIUM BATTERY INCLUDING A LITHIUM MOLYBDATE CATHODE

Jean-Marie Tarascon, Millington, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Oct. 9, 1986, Ser. No. 917,020
Int. Cl.[4] H01M *4/48*
U.S. Cl. 429—194 **3 Claims**

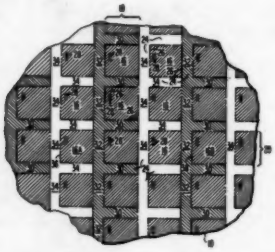
1. A non-aqueous battery including a lithium anode, an electrolyte and a cathode, characterized in that said cathode comprises $Li_xMo_2O_4$ wherein x is an integer ranging from 0.3 to 2.

4,710,440

TEST MASK FOR DETERMINING ALIGNMENT OF AN AUTOMATIC IC MASK TESTING APPARATUS

Paul J. Del Priore, Somerville, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Jul. 14, 1986, Ser. No. 885,165
Int. Cl.[4] G03F *9/00*
U.S. Cl. 430—5 **7 Claims**



1. A mask for determining whether or not an automatic IC mask testing apparatus is scanning within a desired care area comprising:

(a) a substrate having a major surface;

(b) a plurality of identical care areas defined on said surface in substantially parallel rows, each of said care areas, having first optical properties and being surrounded by peripheral region on said surface which is adjacent an edge of said care area and extends outwardly therefrom,

wherein portions of said peripheral regions have said first optical properties and other portions of said peripheral regions have second optical properties so that for a pair of said care areas, each portions of said peripheral region of one of said pair having said first optical properties spatially corresponds to a portion of said peripheral region of the other of said pair having said second optical properties.

4,710,441

STABLE HIGH RESISTANCE TRANSPARENT COATING

Ian T. Ritchie, Santa Monica, and Wilfred C. Kittler, Westlake Village, both of Calif., assignors to Andus Corp., Canoga Park, Calif.

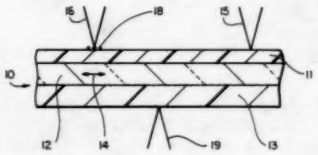
Filed Dec. 18, 1985, Ser. No. 811,126
Int. Cl.[4] G03G *15/04*
U.S. Cl. 430—62 **9 Claims**

1. An apparatus for storing information by supporting electrostatic charges, comprising:

a substrate;

a ground plane disposed on the substrate;

a dielectric material disposed on the ground plane adapted for supporting electrostatic charges thereon when subjected to an electric field created by electrodes;



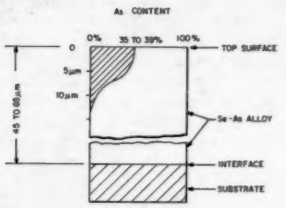
the ground plane comprising a wide band gap semiconducting oxide, the oxide being formed by choosing an undoped wide band gap semiconducting oxide and forming a film from elements constituting the undoped oxide and from a dopant so as to form a doped oxide the doped oxide, having an electrical resistance greater than the undoped oxide.

4,710,442

GRADIENT LAYER PANCHROMATIC PHOTORECEPTOR

Alan L. Koelling; William J. Murphy, and Edward F. Mayer, all of San Jose, Calif., assignors to Ricoh Systems, Inc., San Jose, Calif.

Filed Feb. 11, 1986, Ser. No. 828,371
Int. Cl.[4] G03G *5/082*
U.S. Cl. 430—85 **6 Claims**



1. A photoreceptor comprising selenium-arsenic alloys, characterized by a gradient concentration of arsenic increasing from the bottom surface which interfaces a substrate to the top surface of the photoreceptor such that the arsenic concentration is about 5 wt. % at a depth of about 5 to 10 microns from the top surface of the photoreceptor and is about 35 to 40 wt. % at the top surface of the photoreceptor, wherein said photoreceptor is prepared by vapor deposition of a mixture of selenium-arsenic alloys, comprising about 74.0 wt. % or more of a selenium-arsenic alloy containing about 0 to 1.05 wt. % arsenic, and about 26.0 wt. % or less of a selenium-arsenic alloy containing about 10.0 to 25.0 wt. % arsenic and a selenium-arsenic alloy containing about 35.0 to 40.0 wt. % arsenic, onto a substrate wherein the mandrel holding the substrate is maintained at a temperature in the range of about 70°–80° C. during the entire evaporation procedure.

4,710,443

TONER, CHARGE-IMPARTING MATERIAL AND COMPOSITION CONTAINING TRIAZINE TYPE COMPOUND

Katsuhiko Tanaka, Tokyo, and Hiroshi Fukumoto, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

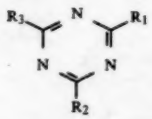
Filed Mar. 18, 1986, Ser. No. 840,854

Claims priority, application Japan, Mar. 19, 1985, 60-53352; May 13, 1985, 60-100925

Int. Cl.[4] G03G 9/14

U.S. Cl. 430—106.6 16 Claims

1. A positively chargeable toner for developing electrostatic latent images, comprising: a binder resin, a colorant, and a triazine type compound represented by the following formula (I):



wherein R_1, R_2 and R_3 are the same or different groups selected from hydrogen atom and electron-donating groups which are more electron-donative than hydrogen atom, all of R_1, R_2 and R_3 not being hydrogen atom.

4,710,444

PROCESS FOR THE FORMATION OF LINEWORK OR HALFTONE MULTICOLOR COLLOID PATTERNS

Luc H. Leenders; Eddie R. Daems, Herentals, and Jan A. Van den Bogaert, Schilde, all of Belgium, assignors to AGFA-Gevaert N.V., Mortsel, Belgium

Filed Jan. 30, 1986, Ser. No. 824,081

Claims priority, application European Pat. Off., Feb. 4, 1985, 85101127.0

Int. Cl.[4] G03C 5/54, 7/22

U.S. Cl. 430—237 11 Claims

1. A process for forming a line or halftone multicolour colloid pattern which process comprises the following steps in sequence:

(1) scanningwise exposing a multicolour original to obtain separate red light, green light and blue light output signals, receiving the latter by photon-detectors to produce separate series of electrical signals corresponding to said different light signals, and feeding the separate series of signals thus produced to a computer,

(2) scanningwise exposing a corresponding number of separate black-and-white photosensitive silver halide emulsion layer materials to a light source controlled by said computer in accordance with the respective series of light signals,

(3) developing a first one of the exposed silver halide emulsion layer materials with a hardening developing agent, and during such development effecting imagewise migration of oxidized hardening developing agent from the developing emulsion layer to a hardenable non-photosensitive gelatin-containing layer coloured with diffusion-resistant coloured substances, said coloured layer being carried at the time of such migration on a permanent support, to selectively harden regions of the coloured layer, and

(4) removing the non-hardened regions of the coloured gelatin-containing layer by wash-off or transfer processing to leave a coloured hardened gelatin relief image on the permanent support, or

(3') developing a first one of the exposed silver halide emulsion layer materials with a hardening developing agent, and during developing effecting imagewise migration of oxidized hardening developing agent from said developing emulsion layer to a hardenable non-photosensitive gelatin-containing layer that is coloured with diffusion-resistant coloured substances and is carried out on a temporary support to selectively harden image regions of the coloured layer, and

(4') removing the non-hardened regions of the coloured gelatin containing layer by wash-off processing to leave a coloured hardened gelatin relief image on the temporary support and then transferring such residual relief image onto a permanent support by pressing the relief image while dry, and in the presence of heat if needed, against the permanent support and removing the temporary support, and

(5) repeating steps (3) and (4) or (3') and (4') with at least another one of said scanningwise exposed photographic emulsion layer materials and a differently coloured non-light sensitive gelatin-containing layer originally carried on a temporary support and transferred to said permanent support on top of the initial relief image thereon in advance of migration of such oxidized developing agent from such other emulsion layer material to add for each repetition another coloured relief image to said permanent support in registration with the preceding coloured relief image thereon.

4,710,445

RESIST IMAGEABLE PHOTOPOLYMERIZABLE COMPOSITIONS

James F. Sanders, St. Joseph Township, County St. Croix, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 22, 1986, Ser. No. 854,850

Int. Cl.[4] G03C 11/12, 3/00, 1/727

U.S. Cl. 430—252 24 Claims

1. An aqueous alkaline developable photopolymerizable composition capable of being imagewise transferred after photopolymerization and development comprising:

(1) a polyfunctional photopolymerizable monomer,

(2) a polyfunctional photopolymerizable polymer which will swell in an aqueous alkaline developer having a pH of 7.5,

(3) an inert, thermoplastic polymeric binder, and

(4) a photoinitiator system for said monomer and polymer, said polymeric binder being non-reactive with the polymerization mechanism of said monomer and polymer, the polymeric binder being not soluble in at least one solution selected from the class consisting of aqueous alkaline solutions at a pH of 9.0, aqueous alcohol solutions, and organic solutions, said polymeric binder in bulk form having a glass transition temperature or softening point between 38° C. and 205° C. and a viscosity of 10^3 poise or less between 63° C. and 205° C. and said composition further containing a colorant in sufficient concentration to provide an optical density of at least 0.3 by having 2 to 50% by weight of colorant in said composition.

2. The composition of claim 1 wherein both said monomer and polymer are ethylenically unsaturated.

3. The composition of claim 2 wherein both said monomer and polymer have ethylenically unsaturated groups selected from the class consisting of acryloyl and methacryloyl groups.

15. A color prepress proofing element capable of being imagewise laminated to a surface after exposure and development comprising a support having on at least one surface thereof a strippable layer comprising the composition of claim 1.

4,710,446

PHOTOSENSITIVE RECORDING MATERIALS

Gerhard Hoffmann, Otterstadt; Reiner Hofmann, Ludwigshafen, and Albert Elzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 14, 1985, Ser. No. 701,536

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1984, 3405959

Int. Cl.[4] G03C *1/495*

U.S. Cl. 430—281 **10 Claims**

1. In a photosensitive recording material for the production of a printing plate or a resist image comprising a dimensionally stable base and a photosensitive recording layer containing a polymeric binder, which photosensitive layer can be developed with water or an aqueous alkaline media, the improvement which comprises using as the polymeric binder a copolymer which is soluble or dispersible in water or an aqueous alkaline medium and contains, as a copolymerized comonomer, the anhydride of the polymerizable, ethylenically unsaturated monocarboxylic acid in an amount of from 0.05 to 2% by weight, based on the copolymer, said copolymer, in addition to the anhydride of the polymerizable, ethylenically unsaturated monocarboxylic acid, containing, as further components, one or more comonomers from the group consisting of vinylaromatic monomers, acrylates and methacrylates, and one or more comonomers from the group consisting of maleic anhydride, maleic half-esters, acrylic acid and methacrylic acid.

4,710,447

COLOR PROOFING AND COLOR PROOFING TRANSFER PROCESS USING WATER DEVELOPED INK

Manny Kreiter, Chicago, Ill., assignor to Castcraft Industries, Inc., Chicago, Ill.

Continuation of Ser. No. 681,929, Dec. 14, 1984, abandoned. This application Dec. 22, 1986, Ser. No. 4,857

Int. Cl.[4] G03C *7/00, 7/20;* G03F *3/06*

U.S. Cl. 430—293 **9 Claims**

1. A tone-accurate color process proof comprising a substrate coated with a photo-sensitive water soluble ink solution that has been exposed to actinic light through an image-bearing negative, said photo-sensitive ink being such that only the unexposed portion thereof is water removeable from said substrate by means of a water spray; said method comprising the steps of:

(a) applying a first sealer coat over said substrate to prevent ink from being unintentionally absorbed into the substrate;
(b) drying said first sealer coat;
(c) applying next a layer of powdered material as a matting agent;
(d) applying a photo-sensitive water soluble ink layer over said layer of powdered material;
(e) spreading said ink layer over said powdered layer;
(f) drying said ink layer;
(g) exposing the foregoing layers of materials to actinic light through an image-bearing film comprising the design to be formed on said substrate, whereby said photosensitive ink material hardens only where exposed to said actinic light;
(h) removing the unexposed photo-sensitive ink layer and powder only in the areas of said unexposed photo-sensitive ink layer by means of a light water spray;
(i) drying said water spray; and
(j) repeating steps (c)–(i) for each additional color coat desired to be applied to said substrate.

8. A method of producing a tone-accurate color transfer comprising a non-porous substrate coated with a photo-sensitive water soluble ink over varnish material containing a release agent; said ink being exposed to actinic light through an image-bearing negative, said photo-sensitive ink being such that only the unexposed portion thereof is water removeable from said substrate by means of a water spray, said method comprising the steps of:

(a) applying a varnish coat containing a release agent over said substrate;
(b) drying said release coat;
(c) applying a layer of powdered material over said release coat;
(d) applying a water soluble photo-sensitive ink compound layer over said powdered layer;
(e) spreading said ink layer over said powdered layer;
(f) drying said ink layer;
(g) exposing the foregoing layers of materials to actinic light through a reversal image bearing film comprising the design to be formed on said substrate, whereby said photo-sensitive ink solution material hardens only where exposed to said actinic light;
(h) removing the unexposed photo-sensitive ink solution layer and powder only in the areas of said unexposed photo-sensitive ink layer by means of a light water spray;
(i) drying said water spray;
(j) repeating steps (c)–(i) for each additional color coat desired to be applied to said substrate;
(k) removing unexposed release coat with developer; and
(l) applying a pressure sensitive adhesive material over said layers of materials as a final coat.

4,710,448

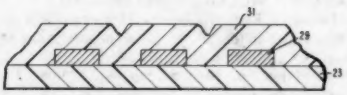
METHOD OF FABRICATING ULTRA-THIN FLEX CABLES

Jacques F. Linder, Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 651,406, Sep. 17, 1984, abandoned. This application Apr. 11, 1986, Ser. No. 851,873

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—314 **6 Claims**



1. A method of fabricating an ultra-thin flex cable having a thickness of about 0.0010 inch or less comprising the steps of:

(a) providing a thin metallic foil having opposing first and second planar surfaces;
(b) vapor depositing a first insulating layer onto said first planar surface of said conductive metallic foil;
(c) treating said second planar surface of said metallic foil to form a plurality of spaced-apart conducting lines wherein said first insulating layer supports said spaced-apart conducting lines; and
(d) vapor depositing a second insulating layer onto said second planar surface of said metallic foil remaining after said treating of step (c) so as to cover said conducting lines and fill the spaces therebetween and form said ultra-thin flex cable including said first and second insulating layers and said spaced-apart conducting lines, and having a thickness of about 0.0010 inch or less.

4. The method of claim 1 wherein said conducting lines are formed by photolithographic etching.

4,710,449

HIGH CONTRAST LOW METAL ION POSITIVE PHOTORESIST DEVELOPING METHOD USING AQUEOUS BASE SOLUTIONS WITH SURFACTANTS

James M. Lewis, Williamsville, N.Y., and Andrew J. Blakeney, Seekonk, Mass., assignors to Petrarch Systems, Inc., Bristol, Pa.

Filed Jan. 29, 1986, Ser. No. 823,892

The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.

Int. Cl.[4] G03F *7/26;* G03C *5/00*

U.S. Cl. 430—326 **30 Claims**

1. A process for developing a positive radiation sensitive

resist film comprised of radiation sensitive quinone diazide sulfonic acid derivatives in admixture with an alkali soluble resin that has been coated on a substrate and exposed to radiation in the form of a pattern to form soluble areas in the coating which are dissolved by the developer to form a surface relief pattern and which comprises:

(a) contacting the exposed film with a solution comprising an organic base aqueous solution adjusted to a concentration that does not give development of photoresist and containing a cationic surfactant from about 0.0001 to about 1.0% by weight of the total solution, to form a developer resistant layer

(b) subjecting said film to an aqueous rinse, and

(c) contacting the said film with an organic aqueous base developer solution having a pH of at least 9 or greater and containing from about 0.0001 to 5% based on the weight of developer of a fluorocarbon surfactant having the formula:

$$R_f—Y—(CH_2CH_2O)_mR$$

where Y is a radical selected from the group $—CH_2CH_2O—$, $—SO_2NR—$, $—SO_3—$, $—SO_2N(R')CH_2CO_2—$, $—CO_2—$and $—CO—NR'—$ wherein R_f is either a straight or branched chain of the formula C_pF_{2p+1} where p is an integer of from 3–17 and wherein R is hydrogen or an acyl or alkyl radical of 1 to 30 carbon atoms and m is an integer of 2 to 26 and R′ is hydrogen or an alkyl radical of 1–6 carbon atoms, until the exposed portions of the film are dissolved.

4,710,450

PHOTOGRAPHIC ELEMENT COMPRISING AT LEAST TWO EXOTHERMIC ELECTROCONDUCTIVE LAYERS

Hideki Naito, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 13, 1986, Ser. No. 829,033

Claims priority, application Japan, Feb. 13, 1985, 60-26055

Int. Cl.[4] G03G *15/12*

U.S. Cl. 430—351 **17 Claims**

1. A photographic element comprising at least two exothermic electroconductive layers and at least one layer selected from a photosensitive layer and an image-receiving layer on a support, where upon heat developing the photosensitive layer, or transferring a mobile dye resulting from heat-development of the photosensitive layer to an image-receiving layer, or conducting such heat-development and dye transfer at the same time, electricity is applied to at least one of the electroconductive layers to generate heat, wherein at least one layer of said at least two exothermic electroconductive layers is an exothermic electroconductive layer having the function of a heating element on which at least an auxiliary exothermic electroconductive layer is formed.

4,710,451

HIGH CONTRAST DEVELOPMENT OF SILVER HALIDE EMULSION MATERIAL

Richard A. Ooms, Mechelen, Belgium, assignor to AGFA-Gevaert N.V., Mortsel, Belgium

Filed Mar. 24, 1986, Ser. No. 843,256

Int. Cl.[4] G03C *5/24, 1/06, 1/34*

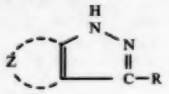
U.S. Cl. 430—441 **13 Claims**

1. A method of effecting high contrast development of an image-wise exposed photographic negative-working silver halide emulsion layer material, the silver halide of which is at least 90 mole percent silver bromide, with the balance being silver chloride and/or silver iodide, which comprises developing said exposed material in the presence of the following ingredients in an aqueous developing medium having a pH of at least 10.5:

(a) hydroquinone or a substituted hydroquinone as sole developing agent in said medium,

(b) an inorganic sulfite compound providing free sulphite ions in an amount of at least 5 grams per liter,

(c) an organic anti-fogging agent corresponding to the following general formula (A):



(A)

wherein:

Z represents the necessary atoms to complete a nitro-substituted homocyclic aromatic nucleus, and

R is hydrogen or a lower (C_1–C_5) alkyl group,

(d) a polymer containing a plurality of alkylene oxide units and having a molecular weight of at least 1500, and

(e) an inorganic alkaline compound imparting said pH to said medium,

said ingredients (a), (b), (c), (d) and (e) being present in said developing medium during said development in such amounts that when said photographic material is image-wise exposed through a continuous tone wedge and test developed in the thus-constituted developing medium for a time of 35 sec. at 38° C. and then fixed there results a silver wedge image corresponding with a log exposure versus density sensitometric curve wherein the maximum gradient (γ) is at least 5 and the product of said maximum gradient (γ) ad of the gradient in the toe (γv) of said curve is at least 20, the maximum gradient being measured between the log exposure values corresponding with the densities 0.3 and 3.0 above fog of said curve and the gradient in the toe being measured between the log exposure values corresponding with the densities 0.1 and 0.6 above fog of said curve.

4,710,452

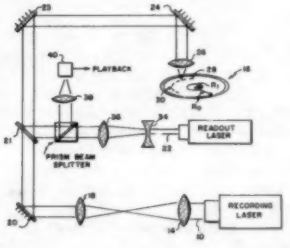
THIN FILM AMORPHOUS OPTICAL RECORDING FILMS

Pranab K. Raychaudhuri, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 15, 1986, Ser. No. 907,423

Int. Cl.[4] G03C *1/72*

U.S. Cl. 430—495 **5 Claims**



1. A recording element comprising, as the optical recording layer, an amorphous thin film of an alloy having the formula:

$$(Ge_xTe_{1-x})_{1-z}Ti_z$$

wherein, on an atom-to-atom basis,

x is from 0.33 to 0.55, and

z is greater than zero up to 0.30.

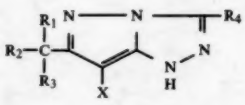
4,710,453

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Shigeto Hirabayashi; Syoji Matsuzaka, both of Hachioji; Yukio Ohya, Hino, and Yoshiyuki Nonaka, Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan

Filed Feb. 18, 1986, Ser. No. 830,180
Claims priority, application Japan, Feb. 19, 1985, 60-29452
Int. Cl.[4] G03C 7/36, 7/38
U.S. Cl. 430—505 14 Claims

1. A silver halide color photographic material having formed on a base photographic layers including a blue-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer and a red-sensitive silver halide emulsion layer, wherein said blue-sensitive silver halide emulsion layer contains at least one highly reactive yellow coupler having a relative coupling reaction rate of 0.3 or more, said green-sensitive silver halide emulsion layer containing at least one compound of Formula (I):



(I)

wherein X is a halogen atom or a monovalent organic group capable of leaving upon coupling reaction with the oxidized product of a developing agent; R_1 to R_3 which may be the same or different each represents a hydrogen atom, a halogen atom, an alkyl group, a cycloalkyl group, an alkenyl group, a cycloalkenyl group, an alkynyl group, an aryl group, a heterocyclic group, an acyl group, a sulfonyl group, a sulfinyl group, a phosphonyl group, a carbamoyl group, a sulfamoyl group, a cyan group, a spiro compound residual group, a bridged hydrocarbon compound residual group, an alkoxy group, an aryloxy group, a heterocyclic oxy group, a siloxy group, an acyloxy group, a carbamoyloxy group, an amino group, an acylamino group, a sulfonamido group, an imido group, a ureido group, a sulfamoylamino group, an alkoxycarbonylamino group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, an alkoxycarbonyl group, an aryloxycarbonyl group, an alkylthio group, an arylthio group or a heterocyclic thio group, provided that at least two of R_1 to R_3 are other than a hydrogen atom; and R_4 is a hydrogen atom, an alkyl group, an aryl group, a heterocyclic group, an acylamino group, an alkylamino group, an anilino group, an alkoxycarbonyl group or an alkylthio group.

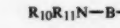
4,710,454

PHOTOGRAPHIC RECORDING MATERIAL AND A PROCESS FOR THE PRODUCTION OF PHOTOGRAPHIC IMAGES

Hans Langen: Heinz-Dieter Schütz; Ubbo Wernicke, Wolfgang Himmelmann; and Günter Renner, all of Agfa-Gevaert Aktiengesellschaft, D-5090 Leverkusen, Fed. Rep. of Germany

Filed Jan. 6, 1986, Ser. No. 816,329
Claims priority, application Fed. Rep. of Germany, Jan. 15, 1985, 3501074
Int. Cl.[4] G03C 1/34, 7/32
U.S. Cl. 430—546 8 Claims

1. A photographic recording material with at least one photosensitive silver halide emulsion layer, a coupler associated with the silver halide emulsion layer and optionally further layers, characterised in that it contains at least one phosphonic acid of the following structures



or

-continued

wherein

X represents PO_3M_2 or CO_2M

M represents a hydrogen atom or a cation which confers water-solubility,

B represents $(CH_2)_n$, whereby n is an integer or a substituted alkylene group,

R_{10},R_{11} are the same or different and represent hydrogen, an optionally substituted carbamoyl group, an optionally substituted alkyl group, an optionally substituted aryl group, an optionally substituted aralkyl group preferably having from 7 to 9 carbon atoms, an optionally substituted alicyclic group or an optionally substituted heterocyclic radical or together the ring members for forming a ring system with 5 or 6 ring members;

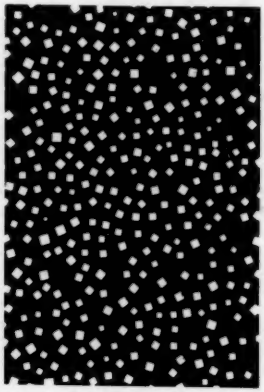
and, in the coupler-containing layer, at least one polyacrylic acid derivative.

4,710,455

NOVEL SILVER HALIDE CRYSTAL AND PROCESS FOR PRODUCTION OF SAME

Keisuke Iguchi, and Seigo Ebato, both of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Apr. 2, 1986, Ser. No. 847,315
Claims priority, application Japan, Apr. 8, 1985, 60-75042
Int. Cl.[4] G03C 1/02
U.S. Cl. 430—567 14 Claims



1. Silver halide crystals which are cubic type crystals and which have a depression on each face thereof and/or a hollow portion formed by joining of the depression with other depressions.

4,710,456

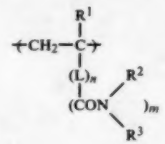
SILVER HALIDE PHOTOGRAPHIC MATERIAL

Takashi Naoi; Takashi Fujioka; Hisashi Okamura, and Masaki Satake, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 11, 1985, Ser. No. 774,681
Claims priority, application Japan, Sep. 12, 1984, 59-191355
Int. Cl.[4] G03C 1/06
U.S. Cl. 430—564 8 Claims

1. A silver halide photographic material comprising a support with at least two silver halide emulsion layers on the same side of said support on one or both sides thereof, wherein at least two of said silver halide emulsion layers contain a poly-

mer having a repeating unit represented by the general formula (I) and/or dextran:



wherein R^1 is a hydrogen atom or an alkyl group having 1 to 6 carbon atoms; R^2 and R^3, which may be the same or different, each may represent a hydrogen atom, or a group having 10 or less carbon atoms and selected from the group consisting of a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted aralkyl group, and R^2 and R^3 may combine together with the nitrogen atom to which they are attached to form a nitrogen-containing heterocyclic ring; L is an (m+1)-valent connecting group; n is 0 or 1; and m is 1 or 2, and wherein the density of said polymer and/or dextran in the emulsion layer closer to the support is 30 wt% or less than that in the emulsion layer farther from the support than said closer emulsion layer, and wherein said polymer and/or dextran is present in an amount of from about 30 to 40 weight percent based on the total weight of the binder present in said emulsion layers.

4,710,457

MONOCLONAL ANTIBODY FOR HUMAN HEMATOPOIETIC GLYCOPROTEINS AND METHOD

Bo Dupont, South Glenfield Harrison, N.J.; Yasuo Morishima, Nagoya, Japan; Nancy Collins, Larchmont, N.Y.; Shun-ichiro Ogata, Kagoshima, Japan, and Kenneth O. Lloyd, Bronx, N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Filed Jun. 29, 1983, Ser. No. 509,201

Int. Cl.[4] G01N *33/53, 33/577;* **C12P** *37/00*

U.S. Cl. 435—7 **4 Claims**

1. Method for differentiating between human B cells and T cells in a human hematopoietic specimen which comprises (a) contacting the human hematopoietic specimen with monoclonal antibody 4C (ATCC Accession No. HB 8311) under immunoprecipitating conditions so as to allow the formation of 4C: Leu 200 glycoprotein immunoprecipitate complexes: (b) analyzing the immunoprecipitate complexes by SDS-PAGE to determine the presence of Leu 2 glycoproteins having molecular weights of approximately 230 kD, 215 kD, 205 kD and 190 kD; and (c) differentiating B cells from T cells wherein B cells are indicated when the 215 kD glycoprotein predominates in appearance over the 205 kD and 190 kD glycoproteins, are wherein T cells and indicated when the 205 kD and 190 kD glycoproteins predominate over the 215 kD glycoprotein.

4,710,458

NYLON STRIPS FOR MEDICAL ASSAY

Robert Maines, Tappan, N.Y., assignor to R. J. Harvey Instrument Corporation, Hillsdale, N.J.

Continuation-in-part of Ser. No. 76,222, Sep. 17, 1979, Pat. No. 4,279,506. This application Apr. 27, 1981, Ser. No. 257,860

The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.

Int. Cl.[4] C12Q *1/00, 1/28, 1/54*

U.S. Cl. 435—12 **4 Claims**

1. A test strip for quantitatively determining and permanently recording the concentration of analytes in solution, said test strip comprising a non-fibrous Nylon IV Strip having impregnated therein an enzyme and a plurality of test reagents, said enzyme and test reagents adapted to react with the analyte to produce a color, the intensity of which is indicative of said analyte concentration.

4,710,459

PROCESS AND REAGENT FOR THE DETERMINATION OF FIBRIN MONOMER IN PLASMA

Knut Bartl, Wilzhofen, and Helmut Lill, Wielenbach, both of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Aug. 21, 1985, Ser. No. 767,865

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430906

Int. Cl.[4] C12Q *1/56;* **C12N** *9/74, 9/68*

U.S. Cl. 435—13 **5 Claims**

1. Process for the determination of fibrin monomer in plasma, comprising incubating a plasma sample containing fibrin monomer and freed from plasmin inhibitors in buffered solution with tissue plasminogen activator (EPA), plasminogen and a chromogenic plasmin substrate to form a color and measuring color formed to determine the amount of fibrin monomer present in said sample.

4,710,460

DIAGNOSTIC APPLICATIONS OF PHOSPHOFRUCTOKINASE

Kunie Nakamura, 3120-10, Kobuchi, Sagamihara-shi, Kanagawa-ken, Japan

Filed Jun. 15, 1984, Ser. No. 620,822

Claims priority, application Japan, Jun. 20, 1983, 58-109419

Int. Cl.[4] C12Q *1/48*

U.S. Cl. 435—15 **4 Claims**

1. A method of diagnostically detecting malignant neoplasm from a human body fluid sample which comprises:

(i) determining the inhibitory potency against phosphofructokinase of a sample by

(a) adding an aqueous solution of a phosphofructokinase as the first solution to the sample;

(b) then adding to the mixture of the first solution and the sample an aqueous solution of adenosine triphosphate as the second solution;

(c) adding to the reaction mixture of the first and second solutions and the sample, within 30 minutes after the addition of the second solution thereto, an aqueous solution of a mixture of phosphoenolpyruvic acid, beta-nicotinamide adenine dinucleotide in reduced form, pyruvate kinase and lactic acid dehydrogenase dissolved in water, as the third solution;

(d) allowing the resulting admixture to undergo enzymatic reactions;

(e) measuring by a spectrophotometer the light absorbance at 340 nm of the reaction solution where the enzymatic reactions are taking place, the measurement of the light absorbance at 340 nm being made in such manner that the measurement of a first value of the light absorbance is done at the commencement of the enzymatic reaction caused by the addition of the third solution and then the measurement of a second value of the light absorbance at 340 nm of said reaction solution is done after the lapse of a predetermined time;

(f) calculating a numerical difference by subtraction of the second value from the first value, said numerical difference being termed as the value of reduction in the light absorbance; and

(g) comparing the so calculated value of reduction in the light absorbance for the sample with a reference value which is the value of reduction in the light absorbance as similarly measured and calculated with reference samples collected from healthy persons who are confirmed to be free from any malignant neoplasm, to detect any abnormality in the aforesaid calculated value of reduction in the light absorbance for the sample in comparison with said reference value,

(ii) thereby estimating whether a phosphofructokinase-inhibitor is present in the sample at such a potency that is abnormally higher than the potencies normally observed with the reference samples, and

(iii) preliminarily diagnosing for the presence of malignant neoplasms when the sample is estimated to contain the phosphofructokinase-inhibitor at an abnormally high potency.

4,710,461

PROMOTER DERIVED FROM CHLOROPLAST DNA

Tohru Komano, Kyoto, and Kanji Ohyma, Uji, both of Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo and Marubeni Kabushiki Kaisha, Osaka, both of, Japan

Filed Aug. 20, 1984, Ser. No. 642,191

Claims priority, application Japan, Aug. 24, 1983, 58-154270

Int. Cl.[4] C12P *21/00;* **C12N** *15/00, 1/00*

U.S. Cl. 435—68 **13 Claims**

1. A promoter comprising a DNA having the same base sequence as that of a DNA fraction having a size of about 1.1 kbp, which is obtained by cleavage by restriction enzyme Bam HI of a DNA fraction comprising all of a 16SrRNA gene and a part of a 23SrRNA gene, said DNA fraction comprising all of a 16SrRNA gene and a part of a 23SrRNA gene being obtained by cleavage by restriction enzyme Eco RI of chloroplast DNA of *Marchantia polymorpha* L; said promoter being isolated from the rest of the chloroplast DNA of *Marchantia polymorpha L.*

4,710,462

CELL PROLIFERATION INHIBITOR AND METHOD OF PREPARATION

Bernard Jacobson, Lexington, Mass., assignor to Boston Biomedical Research Institute, Boston, Mass.

Continuation-in-part of Ser. No. 700,250, Feb. 11, 1985, abandoned, which is a division of Ser. No. 404,656, Aug. 3, 1982, Pat. No. 4,534,967, which is a continuation-in-part of Ser. No. 758,552, Jul. 24, 1985. This application Feb. 12, 1986, Ser. No. 828,874

Int. Cl.[4] C12P *21/00*

U.S. Cl. 435—68 **7 Claims**

1. A non-extractive method for preparing an inhibitor of cell growth, comprising directly liquefying vitreous gel in the absence of extraction solvent by application of shear forces to the gel so as to directly covert the gel into a liquid, incubating said liquid with collagenase to reduce its viscosity, separating hyalocytes from said collagenase-treated liquid, incubating said hyalocytes in a culture medium, separating said hyalocytes from the medium, chromatographically separating said medium into several fractions of varying molecular weight, and isolating from at least one of said fractions a product having cell growth inhibitory activity.

4,710,463

RECOMBINANT DNA MOLECULES CAPABLE OF EXPRESSING HBV CORE AND SURFACE ANTIGENS

Kenneth Murray, Heidelberg, Fed. Rep. of Germany, assignor to Biogen N.V., Curacao, Netherlands Antilles

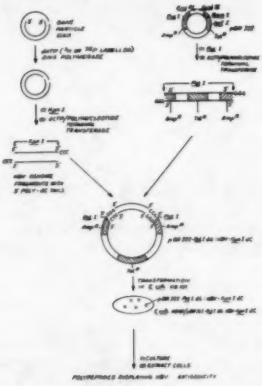
Continuation of Ser. No. 107,441, Dec. 26, 1979, abandoned. This application Mar. 31, 1982, Ser. No. 363,763

Claims priority, application United Kingdom, Dec. 22, 1978, 49907/78; Dec. 27, 1978, 50039/78; Nov. 1, 1979, 7937910

Int. Cl.[4] C12P *21/00, 21/02, 19/34;* **C12N** *15/00, 1/20, 1/00;* **C07H** *15/12;* **C07K** *13/00*

U.S. Cl. 435—68 **36 Claims**

1. A recombinant DNA molecule comprising an HBV DNA sequence, said HBV DNA sequence consisting essentially of a DNA sequence coding on expression in a unicellular host for a polypeptide displaying the antigenicity of an HBV core antigen or HBV surface antigen and being operatively linked to an expression control sequence in said DNA molecule.



4,710,464

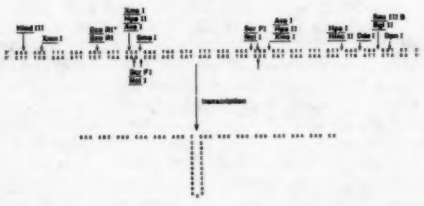
TRANSCRIPTION TERMINATORS

Ramamoorthy Belagaje; Stuart A. Kuhstoss, and R. Nagaraja Rao, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Sep. 27, 1984, Ser. No. 655,184

Int. Cl.[4] C12P *19/34, 21/00;* **C12N** *15/00, 1/00, 1/20, 1/16, 1/18;* **C07H** *21/04*

U.S. Cl. 435—91 **22 Claims**



1. A DNA sequence selected from the group consisting of:

5′ GAAAGCTTTCAAAGAATTCCCGGGTGGGTATT-
3′ CTTTCGAAAGTTTCTTAAGGGCCCACCCATAA-

TCCCACCCGGGTAGTTTTTGTTAACTAAGATCT 3′
AGGGTGGGCCCATCAAAAACAATTGATTCTAGA 4′,

5′ AATTCCCGGGTGGGTATTT-
3′ TTAAGGGCCCACCCATAAA-

CCCACCCGGGTAGTTTTTGTT 3′
GGGTGGGCCCATCAAAAACAA 5′,

and

5′ CCCGGGTGGGTATTTCCCACCCGGGTAGTTTTT 3′
3′ GGGCCCACCCATAAAGGGTGGGCCCATCAAAAA 5′

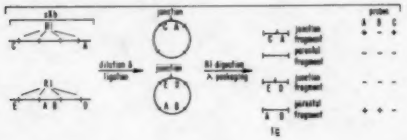
wherein
A is deoxyodenyl
G is deoxyguanyl,
C is deoxycytosyl and
T is thymidyl.

4,710,465

JUNCTION-FRAGMENT DNA PROBES AND PROBE CLUSTERS

Sherman M. Weissman, New Haven, and Francis Collins, Cheshire, both of Conn., assignors to Yale University, New Haven, Conn.

Filed Apr. 19, 1984, Ser. No. 601,916
Int. Cl.[4] C12Q *1/68;* C12N *15/00*
U.S. Cl. 435—91 24 Claims



1. A method of forming a probe capable of binding by homologous base pairing independently to an upstream gene region which is present on a linear section of mammalian genomic DNA and which binds by homologous base pairing to a selected probe, and to a downstream gene region which is also present on said section and is spaced from the upstream gene region by a distance of about 20–2,000 kilobases, said method comprising

digesting the mammalian genomic DNA section by endonuclease treatment to produce genomic fragments, at least some of which have sizes consistent with section fragments containing said upstream and downstream regions at their opposite ends,

ligating the genomic fragments under fragment concentration conditions which favor circularization of single fragments into circular DNA species with connected fragment ends,

digesting the circular DNA species by endonuclease treatment to release digest fragments which are of a size which can be cloned, and which include fragments containing such connected fragment ends,

cloning the digest fragments, and

isolating cloned digest fragments which contain the connected fragment ends, and which are able to bind by homologous base pairing to the selected probe.

4,710,466

METHOD OF CLONING MODIFIED STREPTOMYCETES DNA

Charles L. Hershberger, New Palestine, and Jeffrey L. Larson, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Sep. 25, 1984, Ser. No. 654,063
Int. Cl.[4] C12P *19/34;* C12N *15/00, 1/20, 1/00;* C12R *1/465*
U.S. Cl. 435—91 9 Claims

1. A method for converting naturally-occurring Streptomycetes DNA, said DNA incapable of being cloned into a restrictionless heterospecific host because of the presence of nucleotides other than adenine, guanine, cytosine, on thymine, said method comprising:

(a) inserting said naturally-occurring DNA into a bacteriophage cloning vector and transforming a bacterial host cell with said vector, said vector being capable of replication in said host cell, and

(b) growing said bacterial host cell transformed with bacteriophage cloning vector of step (a) under conditions suitable for replicating and thereby converting said naturally-occuring a replicated DNA consisting of nucleotides selected from the group consisting of adenine, guanine, cytosine, and thymine.

4,710,467

PROCESS FOR PREPARING PHENYLALANINE

Louis L. Wood, Rockville, and Gary J. Carlton, Elkridge, all of Md., assignors to Purification Engineering, Inc., Columbia, Md.

Continuation-in-part of Ser. No. 518,756, Jul. 29, 1983, Pat. No. 4,600,692, which is a continuation-in-part of Ser. No. 465,551, Feb. 10, 1983, and Ser. No. 358,784, Mar. 16, 1982, Pat. No. 4,436,813. This application Aug. 14, 1984, Ser. No. 640,778
The portion of the term of this patent subsequent to Mar. 13, 2001, has been disclaimed.
Int. Cl.[4] C12P *13/22;* C12N *11/08, 11/04*
U.S. Cl. 435—108 1 Claim

1. A process for preparing phenylalanine which comprises contacting a reaction mixture containing phenylpyruvic acid or phenylpyruvate, and aspartic acid or a combination of aspartic acid and glutamic acid, with aspartate transaminase present in *E. coli* ATCC 11303 and recovering phenylalanine in high yield from the reaction mixture.

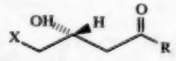
4,710,468

PROCESS FOR PREPARING L-CARNITINE AND CHEMICAL INTERMEDIATES EMPLOYED THEREIN

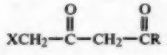
Charles J. Sih, Madison, Wis., assignor to Sigma-Tau Industrie Pharmaceutiche Riunite S.p.A., Rome, Italy

Continuation-in-part of Ser. No. 544,957, Oct. 24, 1983, which is a continuation-in-part of Ser. No. 447,171, Dec. 6, 1982, Pat. No. 4,642,290. This application Feb. 15, 1984, Ser. No. 580,439
The portion of the term of this patent subsequent to Feb. 10, 2004, has been disclaimed.
Int. Cl.[4] C12P *7/62, 7/52*
U.S. Cl. 435—135 3 Claims

1. A process for preparing optically active 4-substituted 3(R) hydroxybutyric acid derivatives having the formula and 3(R) configuration



wherein X is Cl,; and R is an alkoxy radical having from 1 to 4 carbon atoms which comprises subjecting compounds having the formula



wherein X and R have the above-identified meaning to the enzymatic action of an oxido-reductase (EC 1.1.1.35), and recovering the thus formed optically active 4-substituted 3(R)-hydroxybutyric acid derivatives from the enyzmatic reaction mixture.

4,710,469

NOVEL PHOSPHOTYROSYL PROTEIN PHOSPHATASE

Theming Liang, Miami, Fla., and Eve E. Slater, Short Hills, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 2, 1986, Ser. No. 858,622
Int. Cl.[4] C12N *9/12*
U.S. Cl. 435—194 4 Claims

1. A human phosphotyrosyl protein phosphatase enzyme characterized in having a molecular weight of approximately 200,000 as determined by gel filtration high pressure liquid chromatography; a subunit molecular weight of approximately 73,000 as shown by SDS reducing gel electrophoresis; being a dephosphorylating enzyme with characterizing percentage inhibition of dephosphorylation in the present of phosphatase inhibitors as follows:

10 μM molybdate	−96.4%

-continued

5 mM L-tartrate	−98.1%
5 mM NaF	−96.7%
20 mM EDTA	+78.9
100 μM $ZnCl_2$	−14.9
10 μM Vanadate	−38.2
10 mM p-tyrosine	−21.6
10 mM p-serine	+73.4

an SDS gel electrophoresis substantially as shown in FIG. 6; a pH profile using ^{32}P-Tyr angiotensin II and PNPP as substrates substantially as shown in FIG. 7; a rate of dephosphorylation of ^{32}P-Tyr-casein and ^{32}P-Ser-casein substantially as shown in FIG. 8; and an immunological profile substantially as shown in FIG. 9.

4,710,470

PROCESS FOR PRODUCING NEURAMINIDASE

Takayuki Uwajima, and Kazuo Aisaka, both of Machida, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Aug. 1, 1984, Ser. No. 636,552

Claims priority, application Japan, Aug. 4, 1983, 58-142803

Int. Cl.[4] C12N *9/24;* **C12Q** *1/00, 1/34, 1/26, 1/28;* **C12R** *1/29, 1/30*

U.S. Cl. 435—200 **4 Claims**

1. A process for producing neuraminidase which comprises culturing a neuraminidase producing microorganism belonging to the genus Micromonospora in a culture medium, accumulating neuraminidase in the culture liquor and thereafter recovering the neuraminidase therefrom.

4,710,471

NOVEL VECTOR PLASMIDS

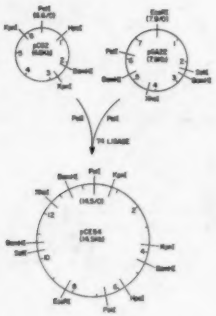
Ryoichi Katsumata; Akio Ozaki, both of Mashida; Tetsuo Oka, Yokohama, and Akira Furuya, Kawasaki, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 450,359, Dec. 16, 1982, abandoned. This application Nov. 5, 1984, Ser. No. 668,674

Claims priority, application Japan, Dec. 17, 1981, 56-204319

Int. Cl.[4] C12N *1/20, 15/00, 1/00*

U.S. Cl. 435—253 **9 Claims**



1. A recombinant vector plasmid which is constructed by introducing a DNA fragment containing an *Eschcrichia coli,* Bacillus or Staphylococcus gene into a plasmid autonomously replicable in and derived from a microorganism belonging to the genus Corynebacterium or Brevibacterium, wherein said recombinant vector plasmid is replicable in said microorganism belonging to the genus Corynebacterium or Brevibacterium and is detectable in said microorganism by expression of the phenotype of said introduced gene.

4,710,472

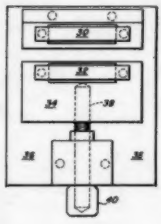
MAGNETIC SEPARATION DEVICE

Joseph W. Saur; Charles P. Reynolds, both of Rockville, Md., and Alfred T. Black, Fairfax, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 25, 1985, Ser. No. 780,123

Int. Cl.[4] C12M *1/00*

U.S. Cl. 435—287 **21 Claims**



1. A magnetic separation device suitable for removing magnetic bead-coated cells from a system, comprising:

at least one sample container containing a sample of magnetic bead-coated cells;

a base;

magnetic means comprised of at least one high energy magnet mounted on said base such that at least one chamber is created near said high energy magnet for holding at least one sample container on said base near said high energy magnet, and a sample container placed in said chamber in close proximity to said magnetic means so that magnetic bead-coated cells within said sample container are attracted by said magnet during use of said device; and

means for adjusting the position of at least one said high energy magnet with respect to said sample container in said chamber.

4,710,473

DNA PLASMIDS

Charles F. Morris, Newbury Park, Calif., assignor to Amgen, Inc., Thousand Oaks, Calif.

Continuation-in-part of Ser. No. 521,964, Aug. 10, 1983, abandoned. This application Aug. 6, 1984, Ser. No. 636,727

Int. Cl.[4] C12N *1/00, 15/00*

U.S. Cl. 435—320 **11 Claims**

1. DNA plasmid pCFM414, A.T.C.C. 40076.

4,710,474

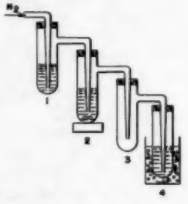
METHOD OF ANALYZING HIGH MOLECULAR WEIGHT DISPERSANTS IN MOTOR OILS

Gilbert R. Malone, Perry; Susan K. Skursha, Mentor, and Robert M. Jost, Willoughby, all of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Aug. 15, 1986, Ser. No. 897,115

Int. Cl.[4] G01N *33/26*

U.S. Cl. 436—60 **23 Claims**



1. A method of analyzing a high molecular weight hydro-

carbyl succinimide dispersant in an oil of lubricating viscosity with oil additive components including a metal dialkyl dithiophosphate, comprising the steps of:

treating a sample of the oil with an amount of iodine sufficient to oxidize the metal dialkyl dithiophosphate in the oil to its corresponding phosphorothionyl disulfide;

subjecting the sample to dialysis in order to remove a substantial portion of the oil and the phosphorothionyl disulfide formed by treating with iodine to obtain a dialysis residue;

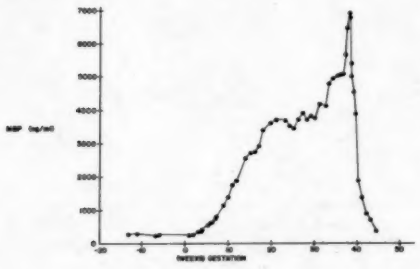
acidifying the dialysis residue and passing the acidified residue dissolved in an eluant through an ion exchange chromatographic column to absorb the acidified residue onto the column and recovering the eluate;

subjecting a portion of the eluate to spectrographic analysis so as to analyze hydrocarbyl succinimide dispersant in the eluate.

4,710,475
METHOD FOR THE DETERMINATION OF THE IMMINENCE OF LABOR

Gerald J. Gleich, and Terri L. Wasmoen, both of Rochester, Minn., assignors to Mayo Medical Resources, Rochester, Minn.

Filed May 12, 1986, Ser. No. 862,451
Int. Cl.[4] G01N *33/48, 33/49, 33/493*
U.S. Cl. 436—86 **4 Claims**



1. A method for determining the imminence of the onset of spontaneous labor in a pregnant woman comprising:

(a) measuring the levels of esoinophil major basic protein (MBP) in a series of samples of a physiological fluid obtained from a pregnant woman after about 20 weeks of pregnancy and before labor begins;

(b) averaging the levels determined in step (a) to determine the plateau gestational level of MBP in the physiological fluid of the pregnant woman; and

(c) subsequently measuring the MBP level in a sample of said physiological fuid and determining whether a rise in the MBP level in said sample above the plateau gestational MBP level has occurred which is at least about 25–30% of the plateau gestational MBP level, wherein said rise is indicative of the imminent onset of spontaneous labor in said pregnant woman.

4,710,476
SURFACE-DERIVATIZED SEMICONDUCTORS WITH CHEMICALLY SENSITIVE LUMINESCENCE

Arthur B. Ellis, and Hal van Ryswyk, both of Madison, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 20, 1985, Ser. No. 811,511
Int. Cl.[4] G01N *21/63*
U.S. Cl. 436—172 **12 Claims**

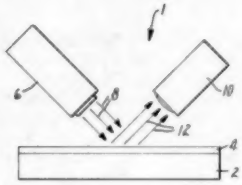
1. An apparatus for detecting the presence of chemical compounds comprising:

(1) a photoluminescent semiconductor having on a radiation emitting surface thereof a reacted material bonded to said radiation emitting surface of said semiconductor, said reacted material being capable of undergoing a redox reaction with an oxidizing or reducing compound to produce a redox product bonded to said radiation emitting surface, which reacted material has an ionic charge distribution which is vertical with respect to the radiation emitting surface, said charge distribution being capable of altering an electric field in said semiconductor,

(2) a source of actinic radiation which impinges on said radiation emitting surface of said semiconductor, and

(3) a means for detecting changes in the radiation emitted from said radiation emitting surface.

10. The process for detecting the presence of chemical components comprising providing a photoluminescent semicon-

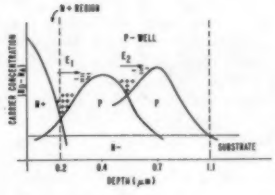


ductor having on at least one radiation emitting surface a reacted material bonded to said radiation emitting surface, said reacted material being capable of undergoing a redox reaction with an oxidizing or reducing compound to produce a redox product bonded to said radiation emitting surface, which reacted material has an ionic charge distribution which is vertical with respect to the radiation emitting surface, said charge distribution being capable of altering an electric field in said semiconductor, irradiating said surface with actinic radiation, observing the radiation emitted from said surface, then exposing said surface to an environment having chemical compounds capable of oxidizing or reducing said reacted material therein and detecting any changes in the radiation emitted from said surface.

4,710,477
METHOD FOR FORMING LATCH-UP IMMUNE, MULTIPLE RETROGRADE WELL HIGH DENSITY CMOS FET

John Y. Chen, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Division of Ser. No. 531,546, Sep. 12, 1983, Pat. No. 4,633,289.
This application Aug. 20, 1986, Ser. No. 898,180
Int. Cl.[4] H01L *21/265*
U.S. Cl. 437—34 **6 Claims**



1. A method of providing latch-up immunity in the fabrication of a CMOS FET at a surface of a substrate comprising the steps of:

(a) performing at least two well impurity ion implants into the surface of said substrate, each of said implants being performed at a different implant energy so as to provide a well region within said substrate having at least two separate and distinct peaks in the carrier concentration profile

extending perpendicularly from the substrate surface into said substrate for the entire depth of the well below portions where source and drain regions are to be formed with sufficient doping density to substantially inhibit latch-up of the FET;

(b) performing an ion implantation of source and drain impurities into the surface of said substrate so as to provide source and drain regions in said well region; and

(c) performing an incomplete anneal of said well, source and drain regions such that a substantial density of residual crystal defects remain in and generally associated with the deepest portions of said source and drain regions and the respective immediately underlying portions of said well, source and drain regions, said residual defects acting as charge carrier recombination centers.

4,710,478

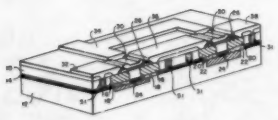
METHOD FOR MAKING GERMANIUM/GALLIUM ARSENIDE HIGH MOBILITY COMPLEMENTARY LOGIC TRANSISTORS

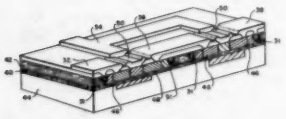
Max N. Yoder, Falls Church, and George B. Wright, McLean, both of Va., assignors to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 20, 1985, Ser. No. 736,051

Int. Cl.[4] H01L *21/203*

U.S. Cl. 437—40 **6 Claims**





3. A method of producing a germanium-gallium arsenide complementary logic transistor comprising the steps of:

providing an undoped gallium arsenide substrate,

growing a first layer of undoped GaAs epitaxial material on the substrate,

depositing a second layer of undoped amorphous germanium onto the layer of undoped GaAs,

implanting protons into portions of the first layer for rendering first portions of the first layer non-conducting,

increasing the heat of the device to a temperature not to exceed 300° C. for crystalizing the germanium by solid phase epitaxy,

implanting germanium ions and gallium ions respectively into first regions of the second and first layers proximate the non-conducting first portion to create regions of high hole concentration,

implanting germanium ions and arsenic ions respectively into second regions of the first and second layers proximate other non-conducting first portions to create regions of high electron concentration,

rapid thermal annealing of the device,

depositing an insulating layer onto appropriate portions of the device, and

depositing metalization contacts over appropriate regions for providing control gates.

5. A method of producing a germanium-gallium arsenide complementary logic transistor comprising the steps of:

providing a high resistivity germanium substrate,

depositing a first layer of GaAs onto the substrate at a temperature less than 320° C.,

depositing a second layer of doped GaAs onto the first layer at a temperature of less than 320° C.,

creating first regions of p+GaAs and n+GaAs in the second layer by ion implantation and subsequent rapid thermal annealing, and

depositing metalization contacts over appropriate regions for providing control gates.

4,710,479

SEALING GLASS COMPOSITION WITH LEAD CALCIUM TITANATE FILLER

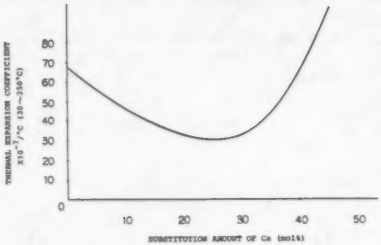
Toshio Yamanaka, and Fumio Yamaguchi, both of Shiga, Japan, assignors to Nippon Electric Glass Company, Limited, Otsu, Japan

Filed Apr. 9, 1987, Ser. No. 36,072

Claims priority, application Japan, Apr. 16, 1986, 61-87542

Int. Cl.[4] C03C *8/14, 8/24, 14/00, 3/064*

U.S. Cl. 501—15 **3 Claims**



1. In a sealing glass composition, as used for sealing members in electronic parts, comprising solder glass powder of a low melting temperature and low expansion coefficient filler powder, the improvement wherein said filler consists essentially of a lead calcium titanate represented by the following chemical formula;

$$(Pb_{1-m}Ca_m)TiO_3$$

where $0<m\leqq 0.40$.

4,710,480

METHOD OF CERAMIC MOLDING WHICH PRODUCES A POROSITY GRADIENT AND THE MANUFACTURE OF COMPOUND MOLDINGS USING THIS METHOD

Rüdiger Buschmann, Amberg; Rudolf Ganz, Mainz-Gonsenheim; Gerd Willmann, Neidernhausen; Ludwig Wirth; Ingo Elstner, both of Wiesbaden, and Peter Jeschke, Walluf, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Dec. 3, 1985, Ser. No. 804,280

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1984, 3444407

Int. Cl.[4] C04B *35/02, 35/80*

U.S. Cl. 501—95 **15 Claims**

1. A ceramic molding manufactured from high-temperature resistant fire-resistant or refractory fibers; and fine-grain, fire-resistant or refractory materials; and additives chosen from a member of the group consisting of surface active materials, densifiers, flocculants, polyacrylate dispersions and combinations thereof, said molding having a porosity of less than 20%, increasing gradually and continuously along an axis of the molding up to more than 70%, wherein the areas with low porosity comprise basically the fine-grain, fire-resistant or refractory materials such that a good dispersion of the fine grain materials and refractory materials is assured, wherein the

areas of high porosity comprise the addivtives and a ceramic fiber on the basis of fibers selected from the group consisting of Al_2O_3, SiO_2, ZrO_2, C, SiC or mixtures thereof, and wherein the intermediate areas comprise mixtures of the ceramic fiber and fire-resistant or refractory materials.

4,710,481

METHOD FOR MELTING TI OR A HIGH-TI ALLOY IN CAO REFRACTORIES

Toru Degawa, Kurashiki; Gen Okuyama, Tamano; Akio Hashimoto, Takamatsu; Seiju Uchida; Kouzou Fujiwara, both of Tamano; Makoto Ebata, Tokyo; Takashi Satou, Sendai, and Tohei Ototani, Tokyo, all of Japan, assignors to Mitsui Engineering & Shipbuilding Co., Ltd., Tokyo, Japan

Filed Sep. 11, 1986, Ser. No. 906,487

Claims priority, application Japan, Sep. 13, 1985, 60-202813

Int. Cl.[4] C04B *2/02*

U.S. Cl. 501—123 **20 Claims**

1. A method for melting Ti, comprising melting Ti in a container formed of high-purity CaO materials having the inner sides thereof composed of not less than 99% by weight of CaO, not more than 0.1% by weight of SiO_2, not more than 0.02% by weight of Fe_2O_3 and not more than 0.5% by weight in total of other metal oxides under a nonoxidizing atmosphere.

16. CaO refractories for use in the melting of Ti or a high-Ti alloy, comprising not less than 99% by weight, of CaO not more than 0.1% by weight of SiO_2, not more than 0.02% by weight of Fe_2O_3, and not more than 0.5% by weight in total of other metal oxides.

4,710,482

OLEFIN POLYMERIZATION CATALYST COMPONENT

Robert C. Job, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 18, 1986, Ser. No. 875,845

Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—127 **14 Claims**

1. A solid magnesium halide/titanium halide catalyst component useful for the polymerization of alpha olefins which has been obtained by the process comprising:

(a) contacting a stable magnesium compound of the formula $[Mg_4(OR)_6(R'OH)_{10}]X$ where X is a counter ion having a total charge of −2 and R and R', which may be the same or different, are selected from alkyl groups of 1 to 4 carbon atoms with a halide of tetravalent titanium in the presence of an electron donor;

(b) contacting the resulting halogenated product with a tetravalent titanium halide;

(c) washing the resulting product to remove unreacted titanium compounds; and

(d) recovering the solid product.

4,710,483

NOVEL CARBONACEOUS MATERIAL AND PROCESS FOR PRODUCING A HIGH BTU GAS FROM THIS MATERIAL

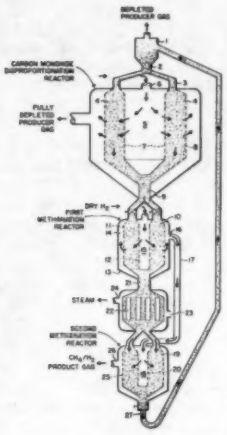
Maksymilian Burk, and Jack L. Blumenthal, both of Los Angeles, Calif., assignors to TRW Inc., Redondo Beach, Calif.

Division of Ser. No. 99,789, Dec. 3, 1979, abandoned, which is a continuation-in-part of Ser. No. 917,240, Jun. 20, 1978, abandoned, which is a continuation-in-part of Ser. No. 817,647, Jul. 21, 1977, abandoned. This application Dec. 17, 1984, Ser. No. 682,459

Int. Cl.[4] B01J *23/74, 27/22;* **C10J** *3/00;* **C10K** *3/04*

U.S. Cl. 502—185 **24 Claims**

1. A fibrous carbonaceous material comprising partially graphitized carbon formed by disproportionation of carbon monoxide at a temperature above 400° C. to about 700° C. at a pressure of about 1 to about 100 atmospheres over a metallic initiator comprising initiator alloy, the initiator alloy comprising at least two of iron, cobalt, and nickel, the fibrous carbonaceous material comprising from about 30 to about 99.5% by weight carbon and from about 0.5 to about 70% by weight ferrous group metal component, the ferrous group metal component comprising a product alloy comprising at least two of iron, cobalt, and nickel, the fibrous carbonaceous material including a major phase and a minor phase, the minor phase



being nodules which are dispersed throughout the major phase and are intimately associated with and at least partly bonded to the carbon in the major phase, the minor phase comprising the ferrous metal product alloy.

4,710,484

METHOD FOR PREPARING A SUPPORTED MIXED-METAL OXIDE OXIDATION CATALYST

Serge R. Dolhyj, Parma; Wilfrid G. Shaw, Lyndhurst, and Marc A. Pepera, Northfield Center, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Jun. 25, 1982, Ser. No. 392,199

Int. Cl.[4] B01J *27/14, 27/198, 27/188, 27/19*

U.S. Cl. 502—208 **10 Claims**

1. An improved method for preparing a supported, mixed-metal oxide oxidation catalyst, the method comprising:

(1) forming a catalyst precursor with a volatile content from a support and the mixed-metal components,

(2) reducing the volatile content of the precursor of (1), and

(3) calcining the precursor of (2) to a finished catalyst,

the improvement comprising conditioning the catalyst precursor with a solution of at least one C_1–C_8 aliphatic alcohol that is substantially free of water and is substantially removed upon calcination subsequent to reducing the volatile content of the

precursor and prior to calcining the precursor to a finished catalyst.

4,710,485

PARAFFIN ISOMERIZATION CATALYST

Stephen J. Miller, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 2, 1985, Ser. No. 782,836
Int. Cl.[4] B01J *27/18*
U.S. Cl. 502—213 8 Claims

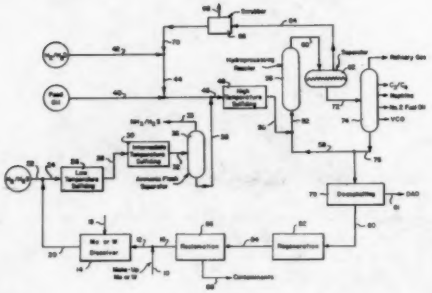
1. A catalyst comprising an intermediate pore size crystalline silicoaluminophosphate molecular sieve and from about 0.01 to about 10 percent by weight of a Group VIII selected from the group consisting of plantinum, palladium, iridium, rhodium, rutherium, and osmium metal, ions of said metal, or mixtures thereof, said crystalline silicoaluminophosphate molecular sieve having resulted from the growth of crystals of said molecular sieve from an aqueous medium containing a water-soluble compound of said Group VIII metal.

4,710,486

PROCESS FOR PREPARING HEAVY OIL HYDROPROCESSING SLURRY CATALYST

Jaime Lopez, Benicia, Calif., and Eugene A. Pasek, Export, Pa., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 527,414, Aug. 29, 1983, Pat. No. 4,552,821. This application Aug. 21, 1985, Ser. No. 767,768
Int. Cl.[4] B01J *27/047, 27/051*
U.S. Cl. 502—219 36 Claims



1. A process including the preparation of a dispersed Group VIB metal sulfide hydrocarbon oil hydroprocessing catalyst comprising sulfiding an aqueous ammonium salt of oxygen-containing Group VIB metal compound in at least three sulfiding steps of increasing temperature including a low temperature sulfiding step having a temperature in the range 70° to 350° F., an intermediate temperature sulfiding step having a temperature in the range 180° to 700° F. which is higher than the temperature in said low temperature sulfiding step, and a feed hydrocarbon oil-containing high temperature sulfiding step having a temperature in the range 500° to 750° F. which is higher than the temperature in said intermediate temperature step, the residence time in each of said sulfiding steps being at least 0.02 hours, some of the oxygen associated with said Group VIB metal being replaced by sulfur in each of said sulfiding steps, in said intermediate temperature sulfiding step the total stoichiometric replacement with sulfur of oxygen associated with said Group VIB metal achieving a maximum level of 50 to 95 percent, with additional replacement of oxygen with sulfur occurring in said high temperature step.

4,710,487

DIESEL EXHAUST GAS CATALYST

Christian Koch, Muhlweg 13, 8570 Pegnitz, Fed. Rep. of Germany

Filed Feb. 7, 1986, Ser. No. 827,412
Claims priority, application Fed. Rep. of Germany, Feb. 11, 1985, 3504556
Int. Cl.[4] B01J *23/10, 23/12, 23/74*
U.S. Cl. 502—303 21 Claims

1. A catalyst for converting hydrocarbons, nitric oxides, and combustion gases comprising:

$LaCoO_3$ serving as a catalyst component, and thorium oxide serving as both a catalyst component and a stabilizer.

4,710,488

HEMOGLOBIN INOSITOL PHOSPHATE COMPOUNDS

Jeffrey T. Wong, Don Mills, Canada, assignor to Fisons plc, Ipswich, England

Division of Ser. No. 662,588, Oct. 19, 1984, Pat. No. 4,650,786. This application Sep. 12, 1986, Ser. No. 906,371
Claims priority, application United Kingdom, Oct. 28, 1983, 8328917
Int. Cl.[4] A61K *35/14;* C07K *13/00*
U.S. Cl. 514—6 5 Claims

1. A modified haemoglobin of formulas (HB)-Za in which Za is a residue of an inositol phosphate aldehyde having 2 to 4 phosphate groups.

4,710,489

GLUTATHIONE DELIVERY SYSTEM

Alton Meister, New York, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation-in-part of Ser. No. 557,555, Dec. 2, 1983, abandoned. This application Jan. 10, 1986, Ser. No. 817,696
Claims priority, application Japan, Apr. 22, 1985, 60-86974; Apr. 22, 1985, 60-86975
Int. Cl.[4] A61K *37/02;* C07K *5/08*
U.S. Cl. 514—18 18 Claims

1. A method for increasing cellular levels in animals of glutathione, comprising: administering a methyl and/or ethyl monoester of glutathione in substantially pure form in an amount to increase intracellular levels of glutathione, whereby said ester is transported into said cells and hydrolyzed intracellularly to glutathione, said ester being of the glycine carboxylic acid group of glutathione.

4,710,490

COMPOSITIONS CONTAINING GANGLIOSIDE MOLECULES WITH ENHANCED ANGIOGENIC ACTIVITY

Nicholas Catsimpoolas, Newton Centre; Robert McCluer, Acton, both of Mass.; Robert S. Sinn, New York, N.Y., and James Evans, Winchester, Mass., assignors to Angio Medical Corporation, New York, N.Y. and Trustees of Boston University, Boston, Mass.

Filed Oct. 1, 1985, Ser. No. 782,724
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—25 29 Claims

1. A composition with angiogenic activity comprising a mixture of gangliosides in an angiogenically effective amount.

4,710,491

N-GLYCOSYLATED CARBOXYLIC ACID DERIVATIVES AS AGENTS FOR COMBATING RHEUMATIC DISEASES

Oswald Lockhoff, Cologne; Peter Stadler, Haan, both of Fed. Rep. of Germany; Hans-Georg Opitz, Berkeley, Calif.; Harald Horstmann; Bodo Junge, both of Wuppertal, Fed. Rep. of Germany, and Bernhard Pelster, St. Augustin, Fed. Rep. of Germany, assignors to Troponwerke GmbH & Co., KG, Cologne, Fed. Rep. of Germany

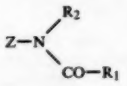
Filed Dec. 14, 1984, Ser. No. 681,965

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1983, 3347522

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—42 8 Claims

1. A method of combating rheumatic diseases which comprises adminstering to a patient afflicted therewith an amount effective to combat such disease of a compound of the formula



in which

Z is a glycosyl radical bonded via the anomeric carbon atom,

R_1 is hydrogen; an alkyl or alkenyl radical with 1 to 21 carbon atoms; an alkyl or alkenyl radical with 1 to 21 carbon atoms interrupted b y 0, S or N; an alkyl or alkenyl radical with 1 to 21 carbon atoms and substituted by halogen, hydroxy, oxo, amino, phenyl nitrophenyl, lower alkyl phenyl or halophenyl; or an alkyl or alkenyl radical with 1 to 21 carbon atoms interrupted by 0, S or N and substituted by halogen, hydroxy, oxo, amino, phenyl nitrophenyl, lower alkyl phenyl or halophenyl; and

R_2 is hydrogen; a saturated aliphatic, cycloaliphatic, alkylcycloaliphatic or araliphatic radical with up to 30 carbon atoms; a saturated aliphatic, cycloaliphatic, alkylcycloaliphatic or araliphatic radical with up to 30 carbon atoms, interupted by O, S, N, NH or N-lower alkyl; a saturated aliphatic, cycloaliphatic, alkylcycloaliphatic or araliphatic radical with up to 30 carbon atoms interrupted by O, S, N, NH or N-lower alkyl; a saturated aliphatic, cycloaliphatic, alkylcycloaliphatic or araliphatic radical with up to 30 carbon atoms substituted by up to 5 oxygen-containing groups or halogen atoms; or a saturated aliphatic, cycloaliphatic, alkylcycloaliphatic or araliphatic radical with up to 30 carbon atoms interrupted by O, S, N, NH or N-lower alkyl and substituted by up to 5 oxygen-containing groups or halogen atoms.

4,710,492

3'-AZIDO-2',3'-DIDEOXY-5-HALOURIDINE AND ITS USE IN TREATING PATIENTS INFECTED WITH RETROVIRUSES

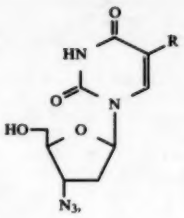
Tai-Shun Lin, North Haven, and William H. Prusoff, North Branford, both of Conn., assignors to Yale University, New Haven, Conn.

Filed Jun. 23, 1986, Ser. No. 677,656

Int. Cl.[4] A61K *31/70*; C07H *17/00*

U.S. Cl. 514—50 19 Claims

1. A 3'-azido-2',3'-dideoxy-5-halouridine compound having the formula



wherein R is a halogen selected from the group consisting of Br and Cl.

4,710,493

THERAPEUTIC AGENT FOR THE USE IN CANCER TREATMENT

Albert Landsberger, Lerchenweg 6, D-6901 Nussloch, Fed. Rep. of Germany

Filed Aug. 14, 1984, Ser. No. 640,661

Int. Cl.[4] A61K *31/725, 31/70, 31/66, 37/54*

U.S. Cl. 514—56 8 Claims

1. A pharmaceutical composition in dosage unit form comprising from about 5 to 500 milligrams of a glycosaminoglycan polysulfate and a cytostatic drug in a quantity ratio of glycosaminoglycan polysulfate to cytostatic drug of from 10:1 to 1:10 by weight in association with a pharmaceutically acceptable carrier with the proviso that said glycosaminoglycan polysulfate is not heparin.

4,710,494

BISTHIOPHOSPHATES AND THEIR USE FOR CONTROLLING PESTS

Rainer Buerstinghaus, Heidelberg, and Heinrich Adolphi, Limburgerhof, both of Fed. Rep. of Germany

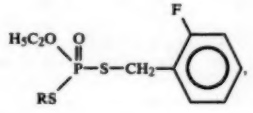
Filed May 28, 1986, Ser. No. 867,574

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520112; Jun. 28, 1985, 3523183

Int. Cl.[4] A01N *57/02*

U.S. Cl. 514—143 7 Claims

1. A benzylbisthiophosphate of the formula



where R is straight-chain or branched alkyl of 3 to 5 carbon atoms.

6. A process for combatting pests, wherein an effective amount of a compound of the formula I as set forth in claim 1 is allowed to act on the pests or their habitat.

4,710,495

SOFT STEROIDS HAVING ANTI-INFLAMMATORY ACTIVITY

Nicholas S. Bodor, Gainesville, Fla., assignor to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan

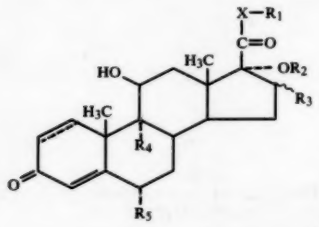
Continuation-in-part of Ser. No. 626,535, Jun. 29, 1984, abandoned, which is a continuation of Ser. No. 418,458, Sep. 15, 1982, abandoned, which is a continuation-in-part of Ser. No. 265,785, May 21, 1981, abandoned, which is a continuation-in-part of Ser. No. 168,453, Jul. 10, 1980, abandoned. This application Apr. 8, 1985, Ser. No. 721,282

Int. Cl.[4] **A61K** *31/58, 31/56;* **C07J** *21/00, 1/00*

U.S. Cl. 514—174 **70 Claims**

1. A compound selected from the group consisting of:

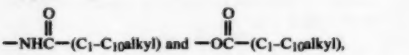
(a) a compound of the formula



(I)

wherein:

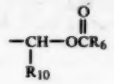
R_1 is C_1–C_{10}alkyl; C_2–C_{10} (monohydroxy or polyhydroxy) alkyl; C_1–C_{10} (monohalo or polyhalo)alkyl; or $—CH_2COOR_6$ wherein R_6 is unsubstituted or substituted C_1–C_{10} alkyl, C_3–C_8 cycloalkyl, C_3–C_8 cycloalkenyl or C_2–C_{10} alkenyl, the substituents being selected from the group consisting of halo, lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,



or R_6 is unsubstituted or substituted phenyl or benzyl, the substituents being selected from the group consisting of lower alkyl, lower alkoxy, halo, carbamoyl, lower alkoxycarbonyl, lower alkanoyloxy, lower haloalkyl, mono(lower alkyl)amino, di(lower alkyl)amino, mono(lower alkyl)carbamoyl, di(lower alkyl)carbamoyl, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl; or R_1 is $—CH_2CONR_7R_8$ wherein R_7 and R_8, which can be the same or different, are each hydrogen, lower alkyl, C_3–C_8 cycloalkyl, phenyl or benzyl, or R_7 and R_8 are combined such that $—NR_7R_8$ represents the residue of a saturated monocyclic secondary amine; or R_1 is unsubstituted or substituted phenyl or benzyl, the substituents being selected from the group of phenyl and benzyl substituents defined hereinabove with respect to R_6; or R_1 is

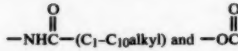
(lower alkyl) wherein Y is —S—, —SO—, $—SO_2—$ or —O— and R_9 is hydrogen, lower alkyl or phenyl, or R_9 and the lower alkyl group adjacent to Y are combined so that R_1 is a cyclic system of the type

wherein Y is defined as above and the alkylene group contains 3 to 10 carbon atoms, of which at least 3 and no more than 6 are ring atoms; or R_1 is



wherein R_6 is defined as hereinabove and R_{10} is hydrogen, lower alkyl, phenyl or halophenyl;

R_2 is unsubstituted or substituted C_1–C_{10} alkyl, C_3–C_8 cycloalkyl, C_3–C_8 cycloalkenyl or C_2–C_{10} alkenyl, the substituents being selected from the group consisting of halo, lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,



or R_2 is unsubstituted or substituted phenyl or benzyl, the substituents being selected from the group consisting of lower alkyl, lower alkoxy, halo, carbamoyl, lower alkoxycarbonyl, lower alkanoyloxy, lower haloalkyl, mono(lower alkyl)amino, di(lower alkyl)amino, mono(lower alkyl)carbamoyl, di(lower alkyl)carbamoyl, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl;

R_3 is hydrogen, α-hydroxy, β-hydroxy, α-methyl, β-methyl, $=CH_2$, or α- or β-OR_2 wherein R_2 is identical to R_2 as defined hereinabove;

R_4 is hydrogen, fluoro or chloro;

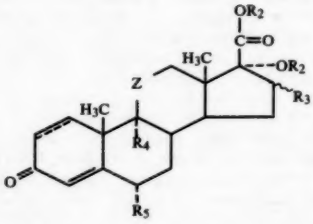
R_5 is hydrogen, fluoro, chloro or methyl;

X is —O— or —S—;

and the dotted line in ring A indicates that the 1,2 linkage is saturated or unsaturated;

(b) a quaternary ammonium salt of a compound of formula (I) wherein at least one of R_1 and R_2 is a halα-substituted alkyl group;

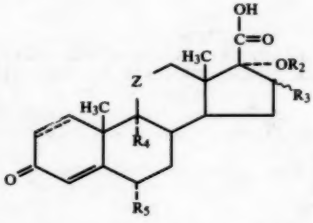
(c) a compound of the formula



(III)

wherein R_2, R_3, R_4, R_5, and the dotted line is ring A are as defined in (a) above, Z is carbonyl or β-hydroxymethylene and R_3 is hydrogen, α-methyl, β-methyl, $=CH_2$ or α- or β-OR_2 wherein R_2 is identical to R_2 above;

(d) a compound of the formula

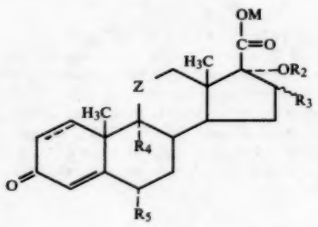


(IV)

wherein R_2, R_4, R_5, and the dotted line in ring A are as

defined in (a) above, Z is carbonyl or β-hydroxymethylene and R_3 is hydrogen, α-methyl, β-methyl, $=CH_2$ or α- or β-OR_2 wherein R_2 is identical to R_2 above;

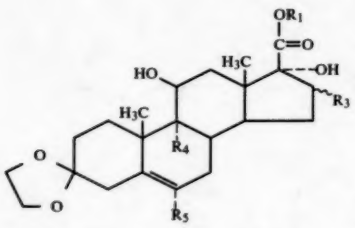
(e) a compound of the formula



(V)

wherein M is alkali metal, thallium, alkaline earth metal/2 or NH_4 and R_2, R_3, R_4, R_5, Z and the dotted line in ring A are as defined in (a) and (d) above;

(f) a compound of the formula

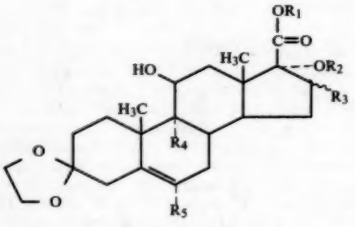


(VII)

wherein R_3 is hydrogen, α-methyl, β-methyl,

or β-OR_2, and R_1, R_4 and R_5 are as defined in (a) above;

(g) a compound of the formula

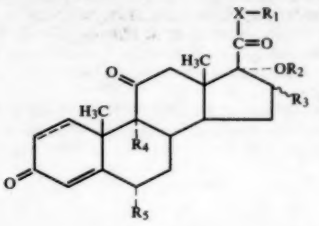


(VIII)

wherein R_3 is hydrogen, α-methyl, β-methyl,

or β-OR_2, and R_1, R_2, R_4 and R_5 are as defined in (a) above;

(h) a compound of the formula



(IX)

wherein R_1, R_2, R_3, R_4, R_5, X and the dotted line in ring A are as defined in (g) above.

64. A pharmaceutical composition of matter comprising an anti-inflammatory effective amount of a compound of claim **1** or **2** having the structural formula (I), in combination with a non-toxic pharmaceutically acceptable carrier therefor suitable for topical or other local application.

4,710,496

PYRROL-1-YLPHENYLDIHYDROPYRIDAZINONES, THEIR PREPARATION AND THEIR USE

Karl-Heinz Geiss, Beindersheim; Bernhard Schmied, Dossenheim; Manfred Raschack, Weisenheim am Sand; Hans-Dieter Lehmann, Hirschberg; Josef Gries, Wachenheim, and Klaus Ruebsamen, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

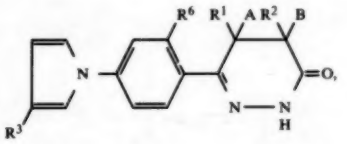
Filed Jul. 9, 1985, Ser. No. 753,278

Claims priority, application Fed. Rep. of Germany, Jul. 12, 1984, 3425632

Int. Cl.[4] **A61K** *31/50*; **C07D** *403/10, 403/14, 401/14*

U.S. Cl. 514—183 **13 Claims**

1. A pyrrol-1-ylphenyldihydropyridazinone of the formula I



I

where R^1 is hydrogen, methyl or hydroxymethyl, R^2 is hydrogen or methyl or R^1 and R^2 together form a methylene or ethylene radical, A and B are each hydrogen, R^3 is formyl or hydroxymethyl or $CH_2—NR^4R^5$ where R^4 is C_1–C_6-alkyl or phenyl-C_1–C_3-alkylene and R^5 is hydrogen, C_1–C_6-alkyl or formyl or R^4 and R^5 together form a C_4–C_7-alkylene radical and R^6 is hydrogen, and its addition salts with acids.

2. A therapeutic composition which inhibits platelet aggregation, reduces blood pressure, inhibits gastric acid secretion and serves as a cardiotonic agent comprising a pharmaceutical excipient and an effective amount of a compound of claim **1** as the active compound.

4,710,497

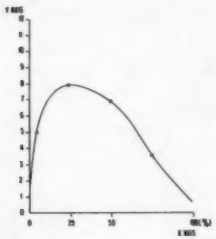
METHOD FOR PERCUTANEOUSLY ADMINISTERING PHYSIOLOGICALLY ACTIVE AGENTS

Jorge Heller, Woodside; Wilfred A. Skinner, Portola Valey; Kenichiro Saito, Menlo Park, all of Calif., and Susumu Satoh, Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 729,023, Apr. 30, 1985, abandoned, which is a continuation of Ser. No. 496,732, May 20, 1983, abandoned. This application May 31, 1985, Ser. No. 739,790

Int. Cl.[4] A61K *31/55*

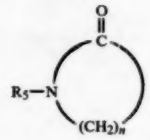
U.S. Cl. 514—221 **8 Claims**



1. A method for percutaneously administering a benzodiazepine to a mammal which comprises applying the physiologically active agent to the skin of the mammal in a mixture comprising at least one of the following components A and at least one of the following components B:

Component A: an alcohol ester of an aliphatic carboxylic acid having a total number of carbon atoms of from 7 to 18 or mixtures thereof;

Component B: a compound represented by the formula:



wherein R_5 represents a hydrogen atom or a lower alkyl group having 1 to 4 carbon atoms and n represents an integer of 3 to 5 or mixtures thereof, wherein the amount of the component A is form 0.1 to 80% by weight based on the total weight of the components A and B.

4,710,498

PYRIDYLOXY DERIVATIVES

Fujio Nohara, Takaoka, and Tomoaki Fujinawa, Toyama, both of Japan, assignors to Ikeda Mohando Co., Ltd., Toyama, Japan

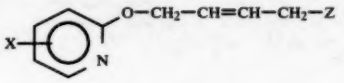
Filed Sep. 30, 1985, Ser. No. 781,881

Claims priority, application Japan, Oct. 2, 1984, 59-206690; Mar. 12, 1985, 60-50207

Int. Cl.[4] A61K *31/501, 31/53, 31/44, 31/41;* **C07D** *401/12, 401/14, 213/64*

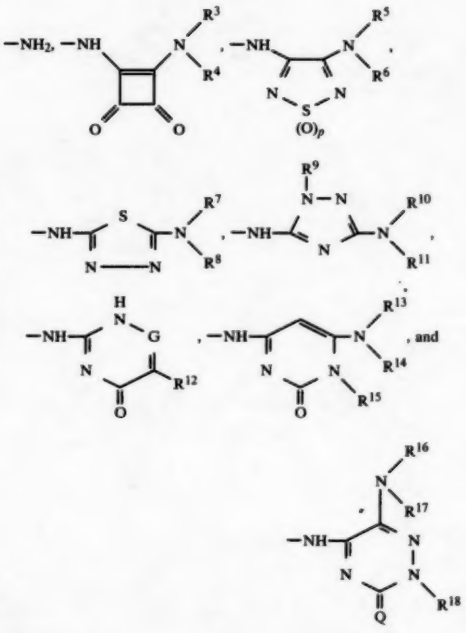
U.S. Cl. 514—242 **22 Claims**

18. A pharmaceutical composition for treatment of digestive ulcers, comprising an effective amount of at least one member selected from the group consisting of pyridyloxy derivatives having the formula:



wherein

X is R^1R^2 N-A-(wherein R^1 and R^2 are, individually hydrogen atoms of C_{1-6} alkyl groups, or R^1 and R^2, taken together with the nitrogen atom bonded thereto, form a four to eight-membered heterocyclic ring, with the nitrogen atom being the sole heretoatom in the ring, which is unsubstituted or substituted by a C_{1-4} alkyl group; A is a straight-chain or branched-chain alkylene group having 1 to 6 carbon atoms; and Z is selected from the group consisting of



wherein

R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{13}, R^{14}, R^{15}, R^{16}, R^{17} and R^{18} are, individually, hydrogen, C_{1-6} alkyl, C_{1-6} alkenyl, C_{1-6} alkynyl, aralkyl groups having a C_{1-6} alkyl group, or a heterocyclic aralkyl group selected from the group consisting of 2-pyridylmethyl, 3-pyridymethyl, 4-pyridylmethyl, 2-furanylmethyl, 2-thiofuranylmethyl, 3-thiofuranylmethyl, 5-dimethylaminomethyl-2-furanylmethyl and 5-dimethylaminomethyl-2-thiofuranylmethyl groups; or R^3 and R^4, R^5 and R^6, R^7 and R^8, R^{10} and R^{11}, R^{13} and R^{14}, R^{16} and R^{17}, respectively, taken together with the corresponding nitrogen atom bonded thereto, form a heterocyclic group selected from the group consisting of azetidino, pyrrolidino, pieridino, and 4-methylpiperazino groups, wherein the aryl portion of said aralkyl group is phenyl or phenyl substituted with methoxy or dimethylaminomethyl groups;

R^{12} is selected from the group selected from hydrogen, C_{1-6} alkyl, a dialkylaminoalkyl group selected from $(R^{19}R^{20}N(CH_2)_q)$, a dialkylaminoalkylbenzyl group selected from $(R^{21}R^{22}N(CH_2)_r—C_6H_5—CH_2—)$ and a pyridylalkyl group selected from $(C_5H_5N—(CH_2)_s—)$,

wherein R^{19}, R^{20}, R^{21} and R^{22} are alkyl groups having 1 to 6 carbon atoms; q, r and s indicate integers of 1 to 6;
G is a nitrogen or carbon atom; p is 0, 1 or 2; and Q is an oxygen or sulfur atom; or
pharmaceutically acceptable salts, hydrates and solvates thereof;
and a pharmaceutically acceptable carrier or excipient.

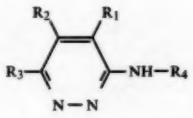
4,710,499

NEW DERIVATIVES OF PYRIDAZINE ACTIVE ON THE CENTRAL NERVOUS SYSTEM

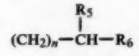
Camille G. Wermuth, Strasbourg, and Jean-Pierre Chambon, Montarnaud, both of France, assignors to Sanofi, Paris, France

Continuation of Ser. No. 406,042, Aug. 6, 1982, abandoned. This application Aug. 7, 1984, Ser. No. 638,363
Claims priority, application France, Aug. 11, 1981, 81 15546
Int. Cl.[4] C07D *237/20*; A61K *31/50*
U.S. Cl. 514—247 **20 Claims**

1. Pyridazine compounds having the formula:



in which
R_1 is a lower alkyl having 1 to 4 carbon atoms or a phenyl group;
R_2 represents H;
R_3 represents H or phenyl;
R_4 represents a group



in which n is an integer of from 1 to 7, R_5 is H or CH_3 and R_6 is selected from H, OR_7, an ester group $OCOR_7$ in which R_7 represents a lower alkyl radical having 1 to 4 carbon atoms as well as the pharmaceutically acceptable acid addition salts of said compounds.

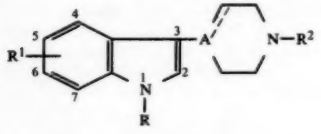
4,710,500

1-(4'-FLUOROPHENYL)-3,5-SUBSTITUTED INDOLES USEFUL IN THE TREATMENT OF PSYCHIC DISORDERS AND PHARMACEUTICAL COMPOSITIONS THEREOF

Jens K. Perregaard, Oelstykke, Denmark, assignor to H. Lundbeck A/S, Copenhagen-Valby, Denmark

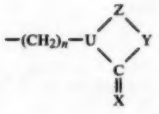
Filed Apr. 1, 1986, Ser. No. 846,912
Claims priority, application United Kingdom, Apr. 10, 1985, 8509164
Int. Cl.[4] A61K *31/495*; C07D *403/14, 403/04, 401/04*
U.S. Cl. 514—254 **9 Claims**

1. A compound selected from the group consisting of a) an indole derivative of the following formula:



1

wherein R is selected from phenyl, optionally substituted with one substituent selected from halogen and trifluoromethyl and a hetero aromatic group selected from 2-thienyl, 3-thienyl, 2-furoyl, 3-furoyl, 2-thiazol, 2-oxazol, 2-imidazole, 2-pyridyl, 3-pyridy and 4-pyridyl;
R^1 is selected from hydrogen, halogen, lower alkyl, lower alkoxy, hydroxy, cyano, nitro, lower alkylthio, trifluoromethyl, lower alkylsulfonyl, amino, lower alkylamino and lower di-alkylamino;
"A" is selected from nitrogen and carbon, and the dotted line indicates - when A is carbon - an optional bond;
R^2 is selected from hydrogen, cycloakyl of C_3–C_4 inclusive lower alkyl and lower alkenyl, optionally substituted with one or two hydroxy groups, any hydroxy group present being optionally esterified with an aliphatic carboxylic acid having from two to twenty-four carbon atoms inclusive, and the group



wherein "n" is an integer of 2–6;
X is selected from oxygen and sulfur, C=X may constitute the group CH=when Y is selected from =N— and =CH—;
Y is selected from oxygen, sulfur, $CH_2$and N-R^3, where R^3 is selected from hydrogen and lower alkyl, lower alkenyl and a cycloalkylmethyl group, said "cycloalkyl" having from three to six carbon atoms inclusive;
Z is selected from $—(CH_2)_m—$, "m" being selected from 2 and 3, and -CH=CH and 1,2-phenylene optionally substituted with a group selected from halogen and trifluoromethyl, and —CO (or S)CH_2—;
U is selected from nitrogen and carbon, provided that when R^1 is chloro, Ais nitrogen and R^2 is selected from methyl and cyclohexyl, R may not be phenyl; and
(b) a pharmaceutically acceptable acid addition salt thereof.
7. A method for the treatment of disorders comprising administering amount in unit dosage form of a compound of claim 1, as an active ingredient, optionally together with one or more pharmaceutical diluents or carriers, to a warmblooded animal including a human being.

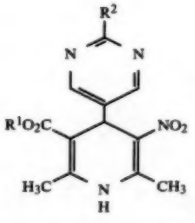
4,710,501

CIRCULATION ACTIVE PYRIMIDINYL-DIHYDROPYRIDINES

Gerhard Franckowiak; Martin Bechem; Rainer Gross, all of Wuppertal; Michael Kayser, Hagen; Matthias Schramm, Cologne, all of Fed. Rep. of Germany, and Günter Thomas, Milan, Italy, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

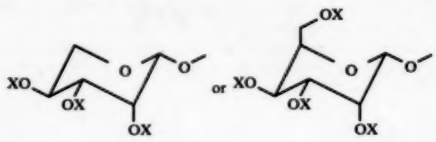
Filed May 13, 1986, Ser. No. 862,869
Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517473
Int. Cl.[4] A61K *31/44*; C07D *401/04, 239/24*
U.S. Cl. 514—256 **7 Claims**

1. A 4-pyrimidinyl-1,4-dihydropyridine of the formula



in which

R^1 represents straight-chain, branched or cyclic alkyl or alkenyl with up to 8 C atoms, which is optionally substituted by phenyl, phenoxy, phenylthio, cyano, hydroxyl, one or more fluorine, chlorine or bromine, by C_1–C_6-alkoxy, C_1–C_6-alkylthio, trifluoromethoxy, carboxyl, C_1–C_4-alkoxycarbonyl, or pyridyl, optionally substituted by fluorine, chlorine, methyl or trifluoromethyl, or by a group of the formulae



in which

X represents hydrogen or acetyl,

or is substituted by an amino group of the formula

wherein

R^3 and R^4 are identical or different and represent hydrogen, or represent phenyl, or represent benzyl, or represent C_1–C_4-alkyl, or represent benzoyl or acetyl, and

R^2 represents hydrogen, or represents straight-chain, branched or cyclic alkyl or alkenyl which has up to 6 C atoms and is optionally substituted by one or more fluorine, chlorine, bromine or cyano, or represents fluorine, chlorine or bromine, or represents phenyl, or represents C_1–C_4-alkoxy, or represents an amino group of the formula

wherein

R^5 R^6 are identical or different and (optionally) represent hydrogen, C_1–C_6-alkyl, C_2–C_6-alkenyl, C_5–C_7-cycloalkyl, phenyl, benzyl, benzoyl or acetyl.

4. A positively inotropic composition comprising an amount effective therefor of a compound or salt according to claim 1 in admixture with a diluent.

4,710,502

3-HETEROARYLALKYL-4-QUINAZOLINONES

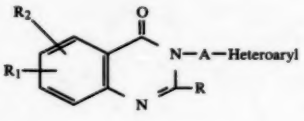
William B. Wright, Jr., and Andrew S. Tomcufcik, both of Bergen, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Nov. 4, 1985, Ser. No. 795,022

Int. Cl.[4] A61K *31/505;* **C07D** *403/06*

U.S. Cl. 514—259 **7 Claims**

7. A composition of matter in dosage unit form, said composition comprising from about 10 mg to about 700 mg of a compound selected from those of the formula:



wherein A is a divalent moiety of the formula:

$$-C_nH_{2n}-,$$

wherein n is an integer from 3 to 10, inclusive; R is hydrogen or alkyl having from one to four carbon atoms; R_1 and R_2 may be the same or different and may be selected from the group consisting of hydrogen, halogen, or trifluoromethyl provided that at least one R_1 or R_2 is halogen or trifluoromethyl; wherein Heteroaryl is

wherein X is CH or N, together with the pharmaceutically acceptable salts thereof in association with a pharmaceutically acceptable carrier.

4,710,503

6-THIOXANTHINE DERIVATIVES

Peter Hofer, Liestal, Switzerland, assignor to Euroceltique S.A., Luxembourg, Luxembourg

Filed Feb. 7, 1985, Ser. No. 699,254

Int. Cl.[4] C07D *473/06;* **A61K** *31/52*

U.S. Cl. 514—263 **7 Claims**

1. The compound 3-propyl-6-thioxanthine and pharmaceutically acceptable salts thereof.

4,710,504

ANTI-DEPRESSANT SPIRO HEXAHYDRO ARYLQUINOLIZINE DERIVATIVES, COMPOSITION, AND METHOD OF USE THEREFOR

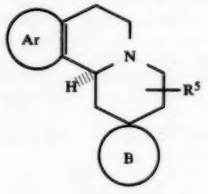
John J. Baldwin, Gwynedd Valley; Joel R. Huff, Ledersch; Joseph P. Vacca, Telford; Steven D. Young, Lansdale; Jane deSolms, Norristown, and James P. Guare, Jr., Quakertown, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 4, 1986, Ser. No. 848,262

Int. Cl.[4] A61K *31/415, 31/305;* **C07D** *455/00, 471/20*

U.S. Cl. 514—267 **24 Claims**

1. A compound of structural formula:



wherein

Ar represents an aromatic heterocycle selected from R^1,R^2-benzo[b]furo-,R^1,R^2-benzo[b]thieno-, thieno-,furo-; R^1,R^2-benxo, R^1,R^2-pyridino, thiazolo, imidazo, and pyrazolo; R^1 and R^2 are independently:

(1) hydrogen,

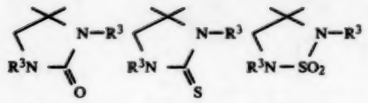
(2) halo,

(3) hydroxy,

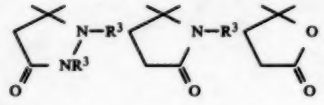
(4) C_{1-3}alkoxy, or

(5) C_{1-6}alkyl;

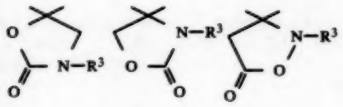
B represents a spiroheterocycle of 4-7 members selected



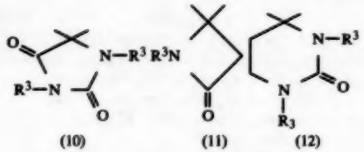
(1) (2) (3)



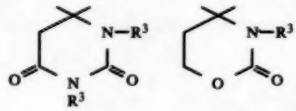
(4) (5) (6)



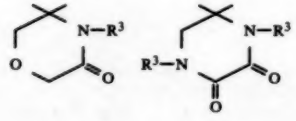
(7) (8) (9)



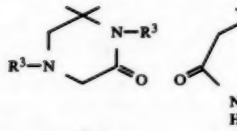
(10) (11) (12)



(13) (14)



(15) (16)



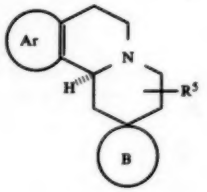
(17) (18)

R^3 is
(1) hydrogen,
(2)

wherein R is hydrogen or C_{1-3}alkyl,
(3) Cl_{1-6}alkyl, either unsubstituted or substituted with one or more of;
(a) hydroxy,
(b) carboxy,
(c) C_{1-3}alkoxycarbonyl,
(d) halo,
(e) C_{1-3}alkoxy,
(f) -$CONR^6R^7$, wherein R^6 and R^7 are the same or different and are hydrogen or C_{1-5}alkyl, or joined together directly to form a 5–7 membered ring selected from pyrrolidino, and piperidino or through a heteroatom selected from O, N and S, to form a 6-membered heterocycle selected from morpholino, piperazino, and N-C_{1-3}alkylpiperazino with the nitrogen to which they are attached,
(g) -NR^6R^7,

(i)—$SO_2NR^6R^7$ or
(j) —$SO_2(C_{1-3}$alkyl; and
R^5 is
(1) hydrogen,
(2) C_{1-6} alkyl, either unsubstituted or substituted with one or more of
(a) —OR^8, wherein R^8 is
(i) H, or
(ii) C_{1-6}alkyl
(b) —NR^8COR^8, or
(c) —CO_2R_8,
(3) —CO_2R^8, or
(4) $CONR^6R^7$.

13. A pharmaceutical composition having α_2-adrenoceptor antagonist activity comprising a pharmaceutically acceptable carrier and an effective α_2-adrenoceptor antagonist amount of a compound of structural formula:



or a pharmaceutically acceptable salt thereof, wherein Ar, B, and R^5 are as defined in claim **1**.

19. A method of treating depression, which comprises administering to a patient in need of such treatment an effective antidepressant amount of the compound of claim **1** or a pharmaceutically acceptable salt thereof.

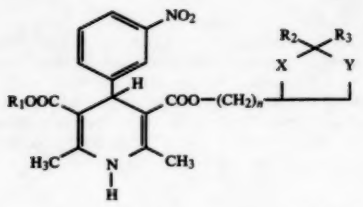
4,710,505

ASYMMETRIC HETEROCYCLIC ESTER DERIVATIVES OF 1,4-DIHYDROPYRIDINE-3,5-DICARBOXYLIC ACIDS

Jacques Robin; Didier Pruneau, both of Dijon, France, and Alain Bonenfant, Genève, Switzerland, assignors to Societe de Recherches Industrielles (S.O.R.I.), Paris, France

Filed Feb. 19, 1986, Ser. No. 830,927
Claims priority, application France, Feb. 20, 1985, 85 02412
Int. Cl.[4] A61K *31/44;* **C07D** *405/12*
U.S. Cl. 514—278 **8 Claims**

1. An asymmetric heterocyclic ester compound of a 1,4-dihydropyridine-3,5-dicarboxylic acid, selected from the group consisting of:
(i) 1,4-dihydro-2,6-dimethylpyridine-3,5-dicarboxylic acid esters of the formula:



(I)

wherein R_1 is a C_1–C_4-alkyl group; X and Y, which are identical or different, each represent O or S, at least one of the symbols X and Y being different from S; n is an integer equal to 1 or 2; and R_2 and R_3, which are identical or different, each represent the hydrogen atom, the methyl group, the trifluoromethyl group, the phenyl group or a halogenophenyl group, wherein R_2 and R_3 taken together, can form a 5-membered to 7-membered spirocycloalkyl group with the carbon atom of the heterocycle to which they are bonded;

(ii) optical isomers thereof; and

(iii) diastereoisomers thereof.

4,710,506

ANTIHYPERTENSIVE THIENOPYRIDINES

Roy V. Davies, Nottinghamshire, and James Fraser, Nottingham, both of England, assignors to The Boots Company PLC, England

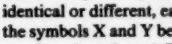
Filed Jun. 13, 1986, Ser. No. 874,337

Claims priority, application United Kingdom, Jun. 15, 1985, 8515207

Int. Cl.[4] A61K *31/44;* **C07D** *495/04*

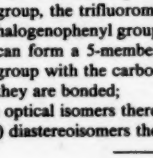
U.S. Cl. 514—301 **36 Claims**

1. A thienopyridone of the formula V,

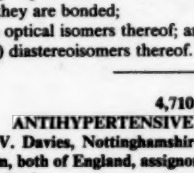


V

or a pharmaceutically acceptable acid addition salt thereof, wherein n is 0 or 1, R_1 is lower alkyl, and Q is a group of the formula VA or VB,



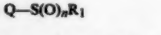
VA



VB

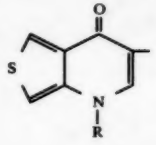
wherein R is lower alkyl and Z in formula VB is hydrogen, lower alkoxy, 2-(lower alkyl), 2-phenyl, 2-(2-halophenyl) or 2-(3-halophenyl).

10. A pharmaceutical composition useful for treating hypertension or heart failure in humans, which comprises an effective amount of a thienopyridone of the formula V,

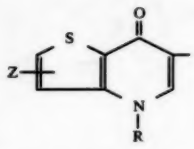


V

wherein n is 0 or 1, R_1 is lower alkyl, and Q is a group of the formula VA or VB,



VA



VB

wherein R is lower alkyl and Z in formula VB is hydrogen, lower alkoxy, 2-(lower alkyl), 2-phenyl, 2-2(-halophenyl) or 2-(3-halophenyl), in combination with a pharmaceutically acceptable carrier.

4,710,507

QUINOLONE INOTROPIC AGENTS

Simon F. Campbell, Deal, and David A. Roberts, Sandwich, both of England, assignors to Pfizer Inc., New York, N.Y.

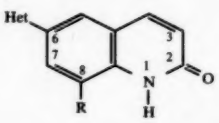
Filed Dec. 18, 1984, Ser. No. 683,440

Claims priority, application United Kingdom, Dec. 22, 1983, 8334282; Jul. 6, 1984, 8417340

Int. Cl.[4] A61K *31/47;* **C07D** *215/18, 215/22*

U.S. Cl. 514—312 **6 Claims**

1. A heterocyclic-substituted 2-quinolone compound of the formula:



(IA)

or a pharmaceutically-acceptable salt thereof, wherein "Het" is pyridyl or triazolyl, optionally substituted by 1 or 2 substitutents each selected from C_1–C_4 alkyl, C_1–C_4 alkoxy, cyano, amino and carbamoyl, said "Het" group being attached by a carbon atom to the 6-position of the quinolone nucleus; and R, which is attached to the 8-position, is hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 alkylsulphinyl, C_1–C_4 alkylsulphonyl, halo, CF_3, hydroxy, hydroxymethyl, or cyano.

6. A method for the treatment of congestive heart failure in a patient which comprises administering to the patient a cardiac stimulating effective amount of a compound of the formula (IA) as claimed in claim **1**, or a pharmaceutically acceptable salt thereof.

4,710,508

O-SUBSTITUTED TETRAHYDROPYRIDINE OXIME CHOLINERGIC AGENTS

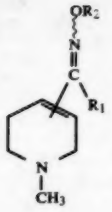
Stephen C. Bergmeier; David A. Downs; Walter H. Moos; David W. Moreland, and Haile Tecle, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 8, 1986, Ser. No. 939,507

Int. Cl.[4] A61K *31/44;* **C07D** *211/70*

U.S. Cl. 514—357 **42 Claims**

1. A compound having the formula



wherein

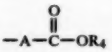
R_1 is

straight or branched alkyl of from one to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;

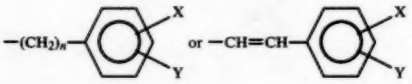
straight or branched alkenyl of from one to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;

straight or branched alkynyl of from one to six carbon atoms optionally substituted from one to four carbon atoms;

cycloalkyl of from three to eight carbon atoms;



where A is a bond or is a hydrocarbon chain of from one to four carbon atoms and when containing two or more carbon atoms may contain one double bond and R_4 is alkyl of from one to six carbon atoms; or



where n is zero to four and X and Y are independently selected from

hydrogen,

fluorine,

chlorine,

bromine,

hydroxy,

straight or branched alkyl of from one to three carbon atoms, or

alkoxyl of from one to four carbon atoms;

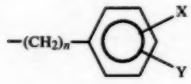
R_2 is selected from

straight or branched alkyl of from one to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;

straight or branched alkenyl of from one to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;

straight or branched alkynyl of from one to six carbon atoms optionally substituted with hydroxy or alkoxyl of from one to four carbon atoms;

cycloalkyl of from three to six carbon atoms;



where n is zero to four and X and Y are independently selected from

hydrogen,

fluorine,

chlorine,

bromine,

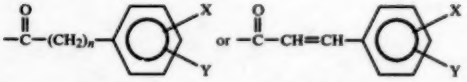
hydroxy,

straight or branched alkyl of from one to three carbon atoms, or alkoxyl of from one to four carbon atoms;

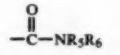
alkylcarbonyl of from two to twelve carbon atoms;

alkenylcarbonyl of from three to twelve carbon atoms;

alkynylcarbonyl of from three to twelve carbon atoms;



where n, X and Y are as previously defined; or



where R_5 and R_6 are independently selected from hydrogen, alkyl of from one to four carbons, and phenyl; or a pharmaceutically acceptable acid addition salt thereof.

39. A pharmaceutical composition useful for alleviating pain in a mammal comprising an analgesically effective amount of a compound as defined in claim **1** together with a pharmaceutically acceptable carrier.

4,710,509

SUBSTITUTED PHENYLSULFONYLAZOLES

Junichi Saito, Mitaka; Tatsuo Tamura, Hamura; Yoshio Kurahashi, Hachioji; Shigeru Uzawa, Sagamihara; Noboru Matsumoto, Hachioji, and Naoko Yamaguchi, Hino, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K. K., Tokyo, Japan

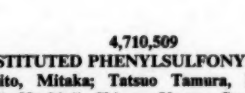
Continuation-in-part of Ser. No. 771,454, Aug. 30, 1985, abandoned. This application Jun. 20, 1986, Ser. No. 876,547

Claims priority, application Japan, Sep. 3, 1984, 59-182579

Int. Cl.[4] **C07D** *249/08, 233/56;* **A01N** *43/50, 43/653*

U.S. Cl. 514—384 **11 Claims**

1. A substituted phenylsulfonylazole of the formula (I)



(I)

wherein

X is N or a CH-group,

R each independently is halogen, lower alkyl, lower alkoxy, trifluoromethyl, nitro, optionally halogeno-substituted phenyl or cycloalkyl, and

n is 2 or 3 and, if R is not a methyl group, may also be 1.

10. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a compound according to claim **1**.

4,710,510

PYRROLOBENZIMIDAZOLES, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM, AND USE OF THEM TO TREAT CERTAIN HEART AND CIRCULATORY DISEASES

Alfred Mertens, Schriesheim; Jens-Peter Hölck, Mannheim; Wolfgang Kampe, Heddesheim; Bernd Müller-Beckmann, Grünstadt; Klaus Strein, Hemsbach, and Wolfgang Schaumann, Heidelberg, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

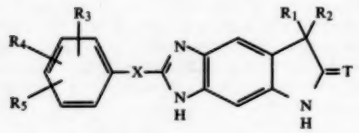
Filed Dec. 10, 1985, Ser. No. 807,260

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445669

Int. Cl.[4] A61K *31/415, 31/55;* C07D *487/04*

U.S. Cl. 514—394 14 Claims

1. A compound or tautomer thereof, of the formula:



(I)

wherein

R_1 is hydrogen, C_1–C_6 alkyl, C_2–C_6 alkenyl or C_3–C_7 cycloalkyl;

R_2 is hydrogen, cyano, C_1–C_6 alkyl, C_2–C_6 alkenyl, or a carbonyl group substituted by hydroxyl, C_1–C_6 alkyl, C_1–C_6 alkoxy, amino, C_1–C_6 alkylamino, C_2–C_{12} dialkylamino or hydrazino, or

R_2 and R_1 together with the carbon to which they are attached form a C_3–C_7 spirocycloalkyl ring, or R_1 and R_2 together form a C_3–C_7 alkylidene or a C_3–C_7 cycloalkylidene radical;

R_3, R_4 and R_5, which can be the same or different, each represent hydrogen; C_1–C_5 alkanesulphonyloxy; trifluoromethane-sulphonyloxy; C_1–C_5 alkanesulphonylamino; trifluoromethane-sulphonylamino; N-alkyl-alkanesulphonylamino with 1 to 5 carbon atoms in each alkyl moiety; C_1–C_5 N-alkyl-trifluoromethanesulphonylamino; C_1–C_5 alkylsulphenylmethyl; C_1–C_5 alkylsulphinylmethyl; C_1–C_5 alkylsulphonylmethyl; carbonyl substituted by hydroxyl, C_1–C_5 alkoxy, amino, C_1–C_5 alkylamino or C_2–C_{10} dialkylamino; sulphonyl substituted by amino, C_1–C_5 alkylamino, C_2–C_{10} dialkylamino, morpholino, pyrrolidino, piperidino or hexamethylene-imino, C_1–C_5 alkylcarbonylamino, aminocarbonylamino or C_1–C_5 alkylaminocarbonylamino radical, an C_1–C_5 alkylthio, C_1–C_5 alkylsulphinyl or C_1–C_5 alkylsulphonyl radical, a nitro, halogen, amino, hydroxyl, C_1–C_5 alkyl, trifluoromethyl, C_1–C_5 alkoxy, C_2–C_5 alkenyloxy, C_2–C_5 alkynyloxy, cyano (C_1–C_5)alkoxy, carboxyl(C_1–C_5)alkoxy, and (C_1–C_5)alkoxycarbonyl (C_1–C_5)alkoxy, C_2–C_{10} dialkylamino, 1-imidazolyl or cyano group;

X is a valency bond, C_1–C_4 alkylene or vinylene and

T is an oxygen or

a physiologically acceptable salt thereof with an inorganic or organic acid.

13. A method of treating heart or circulatory diseases that respond to a lowering of blood pressure, a positive inotropic action, an improvement in microcirculation or a combination thereof, comprising administering to a patient in need thereof an amount of the compound of claim 1 effective to treat such heart or circulatory diseases.

4,710,511

ETODOLAC FOR INHIBITION OF JOINT ANKYLOSIS

Paul H. Wooley, Belle Mead, N.J., assignor to American Home Products Corporation (Del.), New York, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,373

Int. Cl.[4] A61U *31/40*

U.S. Cl. 514—411 3 Claims

1. A method for inhibiting joint ankylosis for the treatment of ankylosing spondylitis in a mammal in need of such treatment which comprises administering to the mammal an effective amount of etodolac or a therapeutically acceptable salt thereof.

4,710,512

PESTICIDAL COMPOSITIONS EMPLOYING STABILIZED AMITRAZ

Michael A. Webb, Bar Hill, England, assignor to Schering Agrochemicals Limited, England

Filed Oct. 14, 1986, Ser. No. 918,342

Claims priority, application United Kingdom, Oct. 16, 1985, 8525447

Int. Cl.[4] A01N *37/52, 43/02, 43/22*

U.S. Cl. 514—431 10 Claims

1. A liquid pesticide composition which comprises a solution of 0.5 to 50% weight by volume amitraz in an organic solvent, together with a stabilizing amount from 0.1 to 5% weight by volume of at least one aluminum C_{1-6} alkoxide.

4,710,513

SUBSTITUTED PYRANONE INHIBITORS OF CHOLESTEROL SYNTHESIS

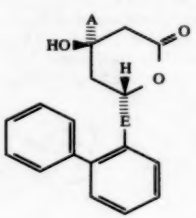
Alvin K. Willard, Wilmington, Del.; Frederick C. Novello, Berwyn, Pa.; William F. Hoffman, and Edward J. Cragoe, Jr., both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 387,065, Jun. 10, 1982, Pat. No. 4,459,422, which is a division of Ser. No. 233,521, Feb. 11, 1981, Pat. No. 4,375,475, which is a continuation-in-part of Ser. No. 140,323, Apr. 14, 1980, abandoned, which is a continuation-in-part of Ser. No. 67,574, Aug. 1, 1979, abandoned. This application Mar. 14, 1984, Ser. No. 589,379

Int. Cl.[4] A61K *31/35*

U.S. Cl. 514—460 4 Claims

1. A compound of the structural formula



wherein:

A is H or methyl: and

E is $-CH_2CH_2$ or $-CH{=}CH-$.

4,710,514
FUNGICIDAL CARBAMATES AND THIOLCARBAMATES

Junya Takahashi; Toshiro Kato, both of Hyogo, and Katsuzo Kamoshita, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 26, 1983, Ser. No. 488,829

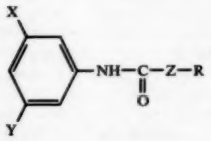
Claims priority, application Japan, May 4, 1982, 57-75766; May 4, 1982, 57-75767

The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.

Int. Cl.[4] A01N *47/20;* **C07C** *125/073*

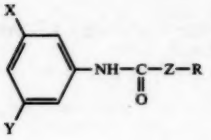
U.S. Cl. 514—485 **8 Claims**

1. A compound of the formula:



wherein X and Y are the same or different and each is a lower alkyl group or a lower alkoxy group, R is a lower alkenyl group, a lower alkynyl group, a lower haloalkyl group, a lower haloalkenyl group, a lower haloalkynyl group or a lower alkyl group substituted with at least one member selected from the group consisting of beta-cyano, lower alkoxy and lower cycloalkyl and Z is an oxygen atom or a sulfur atom.

4. A fungicidal composition which comprises as an active ingredient a fungicidally effective amount of a compound of the formula:



wherein X and Y are the same or different and each is a lower alkyl group or a lower alkoxy group, R is an isopropyl group, a lower alkenyl group, a lower alkynyl group, a lower haloalkyl group, a lower haloalkenyl group, a lower haloalkynyl group or a lower alkyl group substituted with at least one member selected from the group consisting of beta-cyano, lower alkoxy and lower cycloalkyl and Z is an oxygen atom or a sulfur atom, and an inert carrier or diluent.

4,710,515
SUBSTITUTED BIPHENYL DERIVATIVES

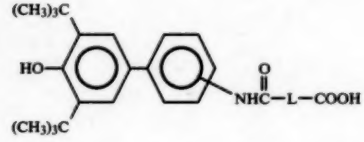
Alan R. Kirk, Cottage Grove, and Robert A. Scherrer, White Bear Lake, both of Minn., assignors to Riker Laboratories, Inc., St. Paul, Minn.

Filed Mar. 17, 1987, Ser. No. 26,877

Int. Cl.[4] A61K *31/195*

U.S. Cl. 514—563 **5 Claims**

1. A compound of the formula



wherein L is divalent phenyl, straight-chained lower alkylene wherein the alkylene chain may optionally contain an ether or thioether linkage, or divalent cycloalkyl, with the proviso that when L is divalent cycloalkyl and the amide carbonyl and the carboxyl are on adjacent carbons, then the amide carbonyl and the carboxyl are cis to each other; or a carboxylate derivative thereof selected from a lower alkyl ester, a (lower)alkylamino(lower)alkyl ester, a pharmaceutically acceptable (lower)alkylamino(lower)alkyl ester acid addition salt and a pharmaceutically acceptable carboxylate salt.

3. A method for inhibiting bronchoconstriction due to an allergic reaction in a mammal comprising administering a compound according to claim 1 to said mammal in an amount effective to inhibit said constriction.

4,710,516
INSECTICIDAL AND ACARICIDAL COMPOSITION COMPRISING A BENZOYLUREA COMPOUND

Marius S. Brouwer, and Arnoldus C. Grosscurt, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

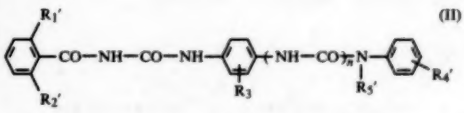
Continuation-in-part of Ser. No. 572,143, Jan. 19, 1984, Pat. No. 4,665,235. This application Nov. 19, 1986, Ser. No. 932,296

Claims priority, application Netherlands, Jan. 24, 1983, 8300238

Int. Cl.[4] A01N *47/28*

U.S. Cl. 514—594 **3 Claims**

1. A composition having insecticidal and acaricidal activity, comprising a liquid or solid inert carrier material and an active substance of the formula.



(II)

wherein

R_1' and R_2' are both fluorine atoms, or wherein R_1' is a chlorine atom and R_2' is a hydrogen atom,

R_3 is a hydrogen atom or represents 1 or 2 substituents which are selected from the group consisting of halogen, methyl and trifluoromethyl,

R_4' is a hydrogen atom or represents 1–3 substitutents which are selected from the group consisting of halogen, C_1–C_4 alkyl, C_1–C_4 haloalkyl and C_1–C_4 haloalkoxy,

n is 0 or 1, and

R_5' is a hydrogen atom or a C_2–C_5 alkyl group,

with the proviso, that, if n is 0 and R_5' is a hydrogen atom, R_3 is a hydrogen atom.

4,710,517
MEDICAL COMPOSITION FOR INJECTION CONTAINING A SPERGUALIN AS ACTIVE INGREDIENT AND PROCESS FOR PREPARING THE SAME

Hamao Umezawa; Shintaro Suzuki; Taka'aki Ohkuma; Fumihiro Sato, all of Tokyo, and Teruya Nakamura, Kusatsu, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed Jan. 9, 1986, Ser. No. 817,266

Claims priority, application Japan, Jan. 14, 1985, 60-3351

Int. Cl.[4] A61K *31/16*

U.S. Cl. 514—616 **4 Claims**

1. A medical composition for injection containing

(1) at least one spergualin compound selected from the group consisting of 1-amino-19-guanidino-11,15-dihydroxy-4,9,12-triazanonadecan-10,13-dione, 1-amino-19-guanidino-11-hydroxy-4,9,12-triazanonadecan-10,13-dione and a medically acceptable salt thereof, and

(2) at least one stabilizer selected from the group consisting of maltose and lactose in an amount between about 0.5 to about 100 parts by weight of said stabilizer per part by weight of said spergualin compound.

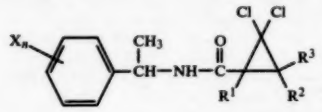
4,710,518

NOVEL N-BENZYL-CYCLOPROPANECARBOXAMIDE FUNGICIDES

Yoshio Kurahashi, Tokyo; Kozo Shiokawa, Kanagawa; Shinzo Kagabu, Tokyo; Shinji Sakawa, Tokyo, and Koichi Moriya, Tokyo, all of Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

Continuation-in-part of Ser. No. 750,558, Jun. 27, 1985, abandoned. This application Apr. 9, 1986, Ser. No. 850,462
Claims priority, application Japan, Jul. 2, 1984, 59-135268; Jul. 6, 1984, 59-138955; Nov. 13, 1985, 60-252822
Int. Cl.[4] C07C *103/737, 61/15;* A01N *37/18*
U.S. Cl. 514—624 10 Claims

1. An N-benzyl-cyclopropanecarboxamide of the formula



wherein

X represents halogen,

n represents 1 or 2,

R^1 represents hydrogen, halogen or lower alkyl,

R^2 represents lower alkyl, halogen-substituted lower alkyl or hydrogen, and

R^3 represents hydrogen or lower alkyl.

4,710,519

PROCESS FOR PREPARING SPRAY DRIED ACETAMINOPHEN POWDER AND THE POWDER PREPARED THEREBY

Jeffrey L. Finnan, Southgate; Rudolph E. Lisa, and Douglass N. Schmidt, both of Grosse Ile, all of Mich., assignors to BASF Corporation, Parsippany, N.J.

Filed Sep. 30, 1985, Ser. No. 781,345
Int. Cl.[4] A61K *31/735, 31/165*
U.S. Cl. 514—629 14 Claims

1. A process of preparing a spray-dried acetaminophen powder, the process comprising:

(a) spray-drying effective amounts of an aqueous slurry of acetaminophen and a binder; and

(b) adding a lubricant to the acetaminophen and binder in the presence of heat so that the lubricant is not susceptible to demixing the the spray-dried acetaminophen.

4,710,520

MICA-POLYMER MICRO-BITS COMPOSITION AND PROCESS

Max Klein, P.O. Box 3, Dalton, Mass. 01226

Filed May 2, 1986, Ser. No. 858,942
Int. Cl.[4] C08J *9/00*
U.S. Cl. 521—55 18 Claims

1. A composition useful as a component of a high temperature filter material, comprising a mixture of mica particles, a majority of said particles being of a size below 40 microns, and polymer micro-bits produced from an expanded, thermoplastic polymer selected from the group of a styrene polymer, a lower polyolefin which is the polymer of an ethylenically unsaturated hydrocarbon monomer having from 2 to 6 carbon atoms, or copolymers or blends of said polymers, each said polymer being non-brittle in expanded form, or produced from a flexible foamed polyurethane, said polymer micro-bits being substantially completely free of intact cells of the expanded or foamed polymer from which they are produced.

4,710,521

CATALYST MIXTURES FOR POLYISOCYANURATE FOAM

Thomas G. Soukup, Clearwater, and John P. Oliver, St. Petersburg, both of Fla., assignors to The Celotex Corporation, Tampa, Fla.

Filed Jul. 25, 1986, Ser. No. 889,560
Int. Cl.[4] C08G *18/14*
U.S. Cl. 521—118 30 Claims

1. A continuous process for producing a rigid polyisocyanurate foam which comprises:

(a) bringing together on a continuouly advancing conveyor an organic polyisocyanate, a minor amount of a polyester polyol, a blowing agent and, in an organic solvent, a catalyst mixture comprising (i) a salt of a low molecular weight carboxylic acid selected from the group consisting of an alkali metal salt and an alkaline earth metal salt and mixtures thereof, (ii) a salt of a higher molecular weight carboxylic acid selected from the group consisting of an alkali metal salt and an alkaline earth metal salt and mixtures thereof, the higher molecular weight carboxylic acid having from about 5 to 30 carbon atoms, and (iii) a tertiary amine, and

(b) forming the foam-forming mixture.

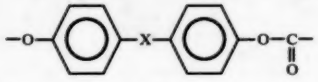
4,710,522

FOAMABLE COMPOSITION AND PROCESS FOR FORMING SAME

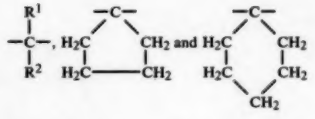
Mark T. Huggard, Mechanicsville, Va., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 766,226, Aug. 16, 1985, abandoned. This application Oct. 9, 1986, Ser. No. 917,341
Int. Cl.[4] C08J *9/08*
U.S. Cl. 521—138 6 Claims

1. A foamable composition comprising an admixture of an aromatic sulfone polymer, said aromatic sulfone characterized by the presence of both aryl ether and aryl sulfone linkages in the polymer backbone; a high molecular weight linear polyester which is a polycondensation product of an aromatic dicarboxylic acid and a glycol; and a high molecular weight linear aromatic polycarbonate represented by the repeating structural unit of the formula



wherein X is a divalent hydrocarbon radical with a total of from 2 to 9 carbon atoms selected from the group consisting of



where R^1 is hydrogen or lower alkyl; and R^2 is phenyl or C_1–C_7 alkyl, said composition free of any chemical non-polymeric blowing agent.

4,710,523
PHOTOCURABLE COMPOSITIONS WITH ACYLPHOSPHINE OXIDE PHOTOINITIATOR

Peter Lechtken, Frankenthal; Ingolf Buethe, Ludwigshafen; Manfred Jacobi, Frankenthal, and Werner Trimborn, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 238,611, Feb. 26, 1981, abandoned, which is a continuation of Ser. No. 148,665, May 12, 1980, Pat. No. 4,298,738, which is a continuation of Ser. No. 55,399, Jul. 6, 1979, abandoned. This application Jan. 18, 1984, Ser. No. 571,794

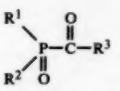
Claims priority, application Fed. Rep. of Germany, Mar. 14, 1979, 2909994

The portion of the term of this patent subsequent to May 5, 1998, has been disclaimed.

Int. Cl.[4] C08F *2/50, 4/00;* **C08L** *63/10*

U.S. Cl. 522—14 **10 Claims**

1. A process for the preparation of photopolymerizable surface-coatings, finishes and printing inks wherein an acylphosphine oxide compound of the general formula



(I)

where

R^1 is straight-chain or branched alkyl of 1 to 6 carbon atoms, cyclohexyl, cyclopentyl, phenyl or naphthyl which is unsubstituted or substituted by halogen, alkyl of 1 to 6 carbon atoms, or an S-containing or N-containing five-membered or six-membered heterocyclic radical selected from pyridyl or thienyl, R^2 has one of the meanings of R^1 with the proviso that R^1 and R^2 may be identical or different, or R^2 is alkoxy of 1 to 6 carbon atoms, phenoxy, methylphenoxy or benzyloxy, or R^1 and R^2 may be joined together to form a five- or six-membered P-containing ring, and R^3 is an at least disubstituted phenyl, pyridyl, furyl or thienyl radical which carries, at least at the two carbon atoms adjacent to the linkage point of the carbonyl group, the substituents A and B, which may be identical or different, and each of which is alkyl, alkoxy or alkylthio of 1 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, phenyl or halogen, or R^3 is α-naphthyl subsituted by A and B at least in the 2- and 8-positions or is α-naphthyl substituted by A and B at least in the 1 and 3 positions, is mixed as a photoinitiator in a concentration of from 0.001% to 20% by weight of the total amount of the photopolymerizable mixture with at least one photopolymerizable material containing at least one carbon-carbon polymerizable double bond and at least one aryl, carbonyl, amino, amido, ester, carboxyl or cyanide group or halogen atom or additional carbon-carbon double bond or carbon to carbon triple bond in photopolymerization activating relationship to the said carbon-carbon polymerizable double bond.

4,710,524
HIGH ENERGY RADIATION STABILIZATION OF SEMI-CRYSTALLINE POLYMERS

John Donohue, New York, N.Y., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation-in-part of Ser. No. 545,578, Oct. 26, 1983, abandoned. This application Aug. 5, 1985, Ser. No. 762,600

Int. Cl.[4] C08J *3/28*

U.S. Cl. 522—75 **21 Claims**

1. A radiation stabilized and sterilized, flexible article comprising:

a polyolefin having a crystalline content of from twenty percent to ninety percent;

0.01 percent to 5.0 percent by weight of a hindered piperidine stabilizer; and

0.01 percent to 5.0 percent by weight of resorcinol monobenzoate, said article having been irradiated with a sterilizing amount of high energy radiation and being substantially resistant to radiolysis while retaining its flexibility.

4,710,525
POLYMER PARTICLES AND LATICES THEREOF FOR THE IMMOBILIZATION OF BIOLOGICALLY ACTIVE SUBSTANCES

Dieter Kraemer, Mainz; Werner Siol, Pfungstadt; Gerhard Markert; Norbert Suetterlin, both of Ober-Ramstadt, and Cornelia Feil, Erzhausen, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Continuation of Ser. No. 827,222, Feb. 5, 1986, abandoned, which is a continuation of Ser. No. 369,099, Apr. 16, 1982, abandoned. This application Nov. 7, 1986, Ser. No. 930,023

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1981, 3116995

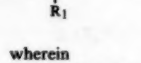
Int. Cl.[4] C08L *83/00*

U.S. Cl. 523—201 **7 Claims**

1. A polymer particle, redispersible in a liquid to form a dispersion and capable of covalently bonding a biological substance to itself, said particle having an average particle diameter between about 0.05 micron and about 5 microns and having an inner core of a first polymer surrounded by an outer shell of a second, different, polymer thereover wherein the ratio of the weight of the polymer of the core to the weight of the polymer of the shell is between 1:3 and 10:1, said first core polymer imparting dispersibility and stability of form to said particle and being an intrinsically hard polymer having a $T_{\lambda max}$ of at least 0° C., said second shell polymer being hydrophilic and being internally crosslinked, crosslinked or grafted to said core, or both internally crosslinked and crosslinked or grafted to said core, having a $T_{\lambda max}$ of 20°–250° C. in an anhydrous condition, and comprising, by weight of the shell polymer,

(a) from 4.9 to 99.9 percent of a combination of

(i) at least one hydrophilic monomer, which per se forms an at least partially water soluble polymer and is selected from the group consisting of methacrylamides and acrylamides of the general formula

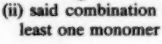


wherein

R_1 is hydrogen or methyl and

R_3 and R_4, independently of each other, are selected from the group consisting of hydrogen and alkyl having 1 to 4 carbon atoms;

(ii) said combination including at least 0.1 percent of at least one monomer of the formula



wherein

Z′ is a free radically polymerizable vinyl group,

R is a spacing unit,

X is sulfonic acid halide, thioisocyanate, an activated ester of N-hydroxysuccinimide or a N-hydroxyphthalimide, carbonyldioxy, carbonylimidoyldioxy, haloethoxy, haloacetoxy, oxirane, formyl, keto, acryloyl, or anhydride, and n has the value 0 or 1;

(b) from 0 to 95 percent by weight of at least one non-hydrophilic monomer selected from the group consisting of esters of acylic acid and methacrylic acid with C_1–C_{20} alcohols and vinyl esters of C_2–C_4 alkanoic acids; and

(c) from 0.1 to 20 percent by weight of at least one polyunsaturated crosslinking monomer.

4,710,526

ALKALINE CURING EMULSIONS FOR USE IN CEMENT ADMIXTURES

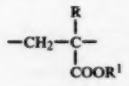
Minoru Tokumoto, Nara; Motoyuki Takagi; Shizuo Shitaoka, both of Osaka, all of Japan; Samuel Gold, Watchung, and Carmine P. Iovine, Bridgewater, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Jul. 2, 1986, Ser. No. 878,441

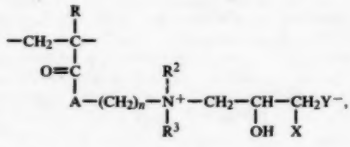
Int. Cl.[4] C08K 3/22

U.S. Cl. 524—5 **18 Claims**

1. A cement admixture comprising a cement and an effective amount of an aqueous emulsion of an acrylate polymer with a Tg between below 10° C. and −40° C., the polymer comprising (a) about 25–85% of an acrylate or methacrylate monomer, (b) about 0.5–15% of an alkaline-curable cationic quarternary ammonium salt monomer, (c) 0–70% of a hydrolytically-stable monomer other an (a) or (b), and (d) 0–30% of a hydrolytically-unstable monomer other than (a) or (b) with the percentages being by weight and totaling 100%; wherein the acrylate unit in the polymer and has the formula



and the alkaline-curable cationic quarternary ammonium unit in the polymer has the formula



where R is hydrogen or a methyl group; R^1 is a C_1–C_{12} alkyl group or a C_6–C_{12} cycloalkyl group with the proviso that R^1 is not a methyl or ethyl group when R is hydrogen; R_2 and R_3 are methyl or ethyl groups and R^2 and R^3 may be the same or different; A is —O— or —NH—; X is chlorine, bromine or iodine; Y^- represents an organic or inorganic anion; and n is 2 or 3.

4,710,527

MALONATE-BASED LIGHT STABILIZERS FOR PLASTICS

Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 786,798, Oct. 11, 1985, abandoned. This application Aug. 29, 1986, Ser. No. 901,624

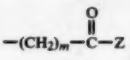
Int. Cl.[4] C08K 5/34

U.S. Cl. 524—98 **13 Claims**

1. A compound of the formula I wherein;

R^1 is selected from hydrogen and an alkyl group of 1 to 5 carbon atoms;

R^2 is selected from hydrogen, oxyl, hydroxyl, a methylene-linked alkyl group having from 1 to 18 carbon atoms, an alkanoyl group having 2 to 18 carbon atoms, an alkenyl group of 3 to 4 carbon atoms, an alkenoyl group having 3 to 6 carbon atoms, an alkynyl group having 3 to 6 carbon atoms, a cyanomethyl group, a 2,3-epoxypropyl group, an aralkyl group of 7 to 15 carbon atoms, a group $—CH_2CH(OR^4)—R^5$, and a group of the formula



wherein m is either zero or one and Z is a group selected from $—OR^6$; $—N(R^7)(R^8)$ and

and when m is zero, Z may be a group —C(O)—OR^{10};

R^3 is selected from an alkyl group of 1 to 18 carbon atoms and a group of formula II,

R^4 is selected from hydrogen, an aliphatic group of 1 to 18 carbon atoms, an araliphatic group, and an aliphatic acyl group of 2 to 18 carbon atoms,

R^5 is selected from hydrogen, an alkyl group of 1 to 16 carbon atoms and phenyl,

R^6 is selected from an alkyl group of 1 to 18 carbon atoms, a cycloalkyl group of 5 to 12 carbon atoms, and a group of formula II wherein R^1 and R^2 are as described above;

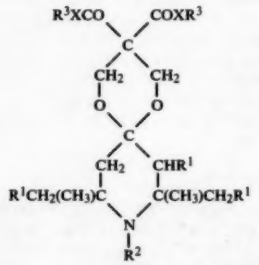
R^7 and R^8, are selected from hydrogen, an alkyl group having 1 to 8 carbon atoms, a cycloalkyl group having 5 to 12 carbon atoms, an aryl group having 6 to 10 carbon atoms, and an aralkyl group having 7 to 15 carbon atoms, R^7 and R^8 together with the nitrogen atom to which they are attached can form a 5 to 7-membered ring selected from pyrrolidine, piperidine and homopiperidine;

A is selected from an alkylene group of 1 to 12 carbon atoms, phenylene, and a group $—NH—R^{11}—NH—$ where R^{11} is selected from an alkylene group of 2 to 18 carbon atoms, a cycloalkylene group having 5 to 18 carbon atoms, an arylene group having 6 to 18 carbon atoms, and an aralkylene group having 7 to 18 carbon atoms, and R^9 is a group of the formula III;

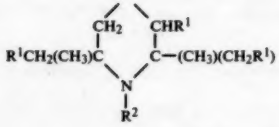
R^{10} is selected from an aliphatic group of 1 to 18 carbon atoms, phenyl and benzyl,

X is either —O— or $—NR^{12}—$ where R^{12} is selected from hydrogen or an alkyl group of 1 to 8 carbon atoms;

and wherein said formulas are as follows:

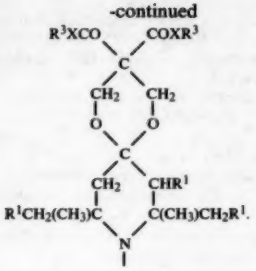


(I)



(II)

-continued



(III)

wherein each R is linear or branched C_1–C_{12} alkyl, C_5–C_7 cycloalkyl, aryl mono- or poly-substituted by C_1–C_{12} alkyl, alkoxy substituted aryl, halo-substituted aryl or unsubstituted aryl and

wherein the ABS is a polymer having the following composition:

A. 5–100% by weight of a graft copolymer prepared by graft polymerization from

1. 10–95% by weight of a mixture from

(i) 50–90% by weight of styrene, α-methylstyrene, nuclear-substituted styrene or methylmethacrylate or mixtures thereof and

(ii) 50–10% by weight of (meth)acarylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleimide or mixtures thereof, on

2. 90–5% by weight of a rubber having a glass transition temperature $T_g \leqq 0°$ C. and

B. 95–0% by weight of a thermoplastic copolymer from

1. 90–50% by weight of styrene, α-methylstyrene, nuclear-substituted styrene or methyl methacrylate or mixtures thereof and

2. 50–0% by weight of (meth)acrylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleimide or mixtures thereof.

4,710,528

FLAME RESISTANT THERMOPLASTIC POLYMERIC COMPOSITIONS COMPRISING (1) MELAMINE BROMOHYDRATE AND (2) SB OR AS COMPOUND ENDOWED WITH IMPROVED FLAME-RESISTANCE

Guido Bertelli, and Renato Locatelli, both of Ferrara, Italy, assignors to Himont Incorporated, Wilmington, Del.

Filed Apr. 29, 1986, Ser. No. 857,635

Claims priority, application Italy, Apr. 30, 1985, 20548 A/85

Int. Cl.⁴ C08K *3/10, 3/20, 5/34*

U.S. Cl. 524—100 **5 Claims**

1. Polymeric compositions endowed with improved self-extinguishing properties, consisting essentially of by weight:

(A) from 57.5 to 98.9% of a thermoplastic polymer;

(B) from the group consisting of 0.1 to 10% of at least a product selected from antimony oxide, antimony oxychloride, antimony trisulfide, metal bismuth and one organic or inorganic oxygenated or non-oxygenated bismuth salt;

(C) from 0 to 1% of a promoter of free radicals;

(D) from 1 to 35% of melamine bromohydrate.

4,710,529

STABILIZED THERMOPLASTIC MOULDING MATERIALS BASED ON ABS POLYMERS AND ACYL PHOSPHANOXIDES

Helmut-Martin Meier, Ratingen; Hans-Georg Heine, Krefeld; Alfred Pischtschan, Kuerten; Rolf Dhein, and Hans Rudolph, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

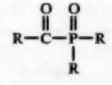
Filed Dec. 4, 1986, Ser. No. 938,141

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1985, 3544000

Int. Cl.⁴ C08F *220/44, 257/02*

U.S. Cl. 524—139 **8 Claims**

1. A thermoplastic moulding material comprising ABS and containing, as stabilizer, an acyl phosphanoxide of the formula



(I)

wherein each R is linear or branched C_1–C_{12} alkyl, C_5–C_7 cycloalkyl, aryl mono- or poly-substituted by C_1–C_{12} alkyl, alkoxy substituted aryl, halo-substituted aryl or unsubstituted aryl and

wherein the ABS is a polymer having the following composition:

A. 5–100% by weight of a graft copolymer prepared by graft polymerization from

1. 10–95% by weight of a mixture from

(i) 50–90% by weight of styrene, α-methylstyrene, nuclear-substituted styrene or methylmethacrylate or mixtures thereof and

(ii) 50–10% by weight of (meth)acarylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleimide or mixtures thereof, on

2. 90–5% by weight of a rubber having a glass transition temperature $T_g \leqq 0°$ C. and

B. 95–0% by weight of a thermoplastic copolymer from

1. 90–50% by weight of styrene, α-methylstyrene, nuclear-substituted styrene or methyl methacrylate or mixtures thereof and

2. 50–0% by weight of (meth)acrylonitrile, methyl methacrylate, maleic anhydride, N-substituted maleimide or mixtures thereof.

4,710,530

FLAME RETARDANT POLYPHENYLENE ETHER MOLDING COMPOSITIONS

Joseph Green, East Brunswick, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed May 1, 1986, Ser. No. 858,612

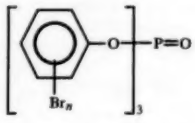
Int. Cl.⁴ C08K *5/52*

U.S. Cl. 524—142 **7 Claims**

1. A flame retarded thermoplastic molding composition consisting essentially of

(a) a normally flammable styrene modified polyphenylene ether resin

(b) a flame retardant amount of a polybromotriphenyl phosphate of the formula



wherein n is a whole number having a value of 0 to 5 inclusive, representing the number of bromine atoms on each phenyl ring, and the ratio of bromine atoms to phosphorus atoms is 3 to 10.

4,710,531

SELF-EXTINGUISHING POLYCARBONATE COMPOSITION

Giovanni Dozzi; Giorgio Della Fortuna, both of Milan, and Salvatore Cucinella, S. Donato Milanese, all of Italy, assignors to Anic, S.p.A., Palermo, Italy

Filed Aug. 19, 1983, Ser. No. 524,788

Claims priority, application Italy, Aug. 25, 1982, 22964 A/82; Aug. 25, 1982, 22965 A/82; Aug. 25, 1982, 22968 A/82; Aug. 26, 1982, 22987 A/82; May 3, 1983, 20903 A/83

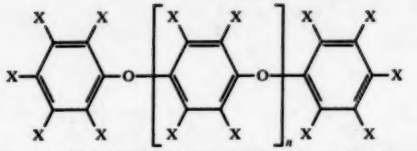
Int. Cl.⁴ C08K *5/17*

U.S. Cl. 524—239 **4 Claims**

1. A self-extinguishing polycarbonate composition consisting of an aromatic polycarbonate having an average viscometric molecular weight between 10,000 and 100,000 mixed with

(A) at least one metal salt and/or ammonium salt of ethylenediaminotetraacetic acid, said metal being selected from the metals of Groups IA, IB, IIA or IIB of the Periodic Table; and

(B) a halogenated organic ether having the general formula (II)



wherein n is an integer from 0 to 10,000 and X can be, independently, hydrogen, fluorine, chlorine or bromine, wherein at least one X per aromatic ring is halogen.

4,710,532

MEDICAL ARTICLE AND METHOD

Ezekiel H. Hull, Greensboro, and Edward P. Frappier, Kernersville, both of N.C., assignors to Morflex Chemical Company, Inc., Greensboro, N.C.

Continuation of Ser. No. 711,284, Mar. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 619,583, Jun. 11, 1984, abandoned. This application May 22, 1986, Ser. No. 866,463

Int. Cl.[4] C08K *5/11*

U.S. Cl. 524—310 **7 Claims**

1. A polyvinyl chloride composition comprising a polyvinyl chloride resin and a plasticizing amount of N-butyryltri-N-hexyl citrate, and N-butyryltri-N-hexyl citrate having heat stability characteristics, after heating at 150° C. for two hours, of a color not greater than 50–60 apha and a mild odor at 25° C.

4. A medical article formed from a polyvinyl chloride composition comprising a polyvinyl chloride resin, a plasticizing amount of N-butyryltri-N-hexyl citrate, a stabilizer and a lubricant, and wherein said citrate has heat stability characteristics after heating at 150° C. for two hours, of a color not greater than 50–60 apha and a mild odor at 25° C.

5. A medical article as claimed in claim 4 comprising a blood bag.

4,710,533

MELT PROCESSABLE CPVC BLENDS

Richard C. Neuman, Vermilion, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 11, 1986, Ser. No. 895,096

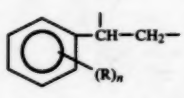
Int. Cl.[4] C08K *5/09;* **C08L** *27/04*

U.S. Cl. 524—394 **8 Claims**

1. A melt processable chlorinated polyvinyl chloride blend comprising:

100 parts by weight of chlorinated polyvinyl chloride, said chlorinated polyvinyl chloride having a chlorine content of from about 60% to about 75% by weight;

an effective amount of a flow enhancing polymer to impart improved melt processability to said chlorinated polyvinyl chloride, said flow enhancing polymer being made from monomers having the formula



where R is an aliphatic having from 1 to 5 carbon atoms, wherein n is an integer of 1 to 3, wherein said effective amount of said flow enhancing polymer is from about 12 parts to about 40 parts by weight per 100 parts by weight of said chlorinated polyvinyl chloride, and

an effective amount of a compatibilizing agent to improve compatibility of the blend so that said blend has an Izod impact value (ASTM D256) of at least 1.5 ft.lbs./in. of notch.

4,710,534

LOW GLOSS, FLAME RETERDANT, IMPACT RESISTANT POLYCARBONATE COMPOSITION

Ping Y. Liu, Naperville, Ill., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 9, 1985, Ser. No. 806,499

Int. Cl.[4] C08K *5/06*

U.S. Cl. 524—411 **16 Claims**

1. A composition comprising

(a) a major quantity of aromatic polycarbonate;

(b) a minor amount of a polyalkylene terephthalate wherein the alkylene group is from 2 to about 10 carbon atoms, and is present in such quantities so as to substantially reduce the DTUL of the polycarbonate;

(c) an effective amount of a combination of impact modifier and gloss suppressant selected from an olefin diene copolymer and an acrylonitrile-butadienealkenylaromatic copolymer; and

(d) an effective amount of flame retardant system to maintain a VO rating for a 1.6 mm sample under UL 94 test conditions wherein the overall composition has a DTUL in °C. of less than or equal to 115° C., a 3.2 mm Notched Izod impact resistance in kilograms f-cm per cm of at least about 10 and has a surface gloss as measured with a Hunter Lab's gloss meter at 60° reflection of less than or equal to about 80 wherein the olefin diene copolymer is present and (a) is from about 60 to 75 weight percent, (b) is from about 8 to 15 weight percent, (c) is from about 4 to 12 weight percent and (d) is from about 12 to 18 weight percent, all weight percents measured on the total of (a), (b), (c), and (d) or wherein the acrylonitrile-butadiene-alkenyl- aromatic copolymer is present and (a) is from about 55 to 75 weight percent, (b) is from about 8 to 15 weight percent, (c) is from about 4 to 12 weight percent and (d) is from about 13 to 22 weight percent, all weight percent measured on the total of (a), (b), (c) and (d).

4,710,535

MASTERBATCHES FOR DELUSTRING POLYAMIDES

Pierre Perrot, Charbonnieres-les-Bains, and Georges Vuillemey, Toussieu Mions, both of France, assignors to Rhone-Poulenc Fibres, Lyons, France

Filed Jun. 9, 1986, Ser. No. 871,827

Claims priority, application France, Jun. 13, 1985, 85 09122

Int. Cl.[4] C08K *3/22, 9/04*

U.S. Cl. 524—413 **9 Claims**

1. Masterbatches intended for delustring processible polyamides by addition of at least a portion of the masterbatch to the polyamide prior to shaping thereof, wherein the masterbatch comprises 50 to 90% by weight of a polyamide selected from the group consisting of homopolyamides and copolyamides used as a binder, consisting of 30 to 100% of hexamethylene adipamide units and 0 to 70% of caproamide units,

10 to 50% by weight of anatase titanium dioxide first coated with a mixture of silica and of alumina in a proportion of 0.01 to 1.5% of silica and 1 to 3% of alumina and then contacted with a polydimethylsiloxane oil present in a proportion of 0.2 to 10% relative to the weight of the coated titanium dioxide powder, the mean particle size of the titanium dioxide in the masterbatch being between 0.15 to 0.45 μm.

4,710,536

PRESSURE-SENSITIVE ADHESIVE TAPE CONTAINING HYDROPHOBIC SILICA

Jurgen Klingen, Schwalmtal, Fed. Rep. of Germany, and Patrick G. Zimmerman, Saint Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 763,458, Aug. 7, 1985, abandoned, and Ser. No. 658,769, Aug. 7, 1985, abandoned. This application Jul. 22, 1986, Ser. No. 888,787

Int. Cl.[4] C08R *3/34*

U.S. Cl. 524—493 8 Claims

1. Pressure-sensitive adhesive tape, the adhesive layer which comprises a copolymer of by weight (a) a major proportion of acrylic acid ester of notertiary alkyl alcohol, the molecules of which have from 1 to 14 carbon atoms, at least a major proportion of said molecules having a carbon-to-carbon chain of 4–12 carbon atoms terminating at the hydroxyl oxygen atom, said chain containing at least about one-half the total number of carbon atoms in the molecule, and (b) a minor proportion of at least one copolymerizable monomer having a polar group, wherein the improvement comprises:

the pressure-sensitive adhesive layer includes hydrophobic silica having a surface area of at least 10 m^2/g and in an amount comprising by weight from 2 to 15 phr.

4,710,537

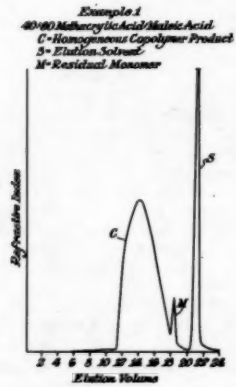
SUBSTANTIALLY HOMOGENEOUS COPOLYMERS OF ACRYLIC OR METHACRYLIC ACID AND MALEIC ACID

Stanley W. Walinsky, Mystic, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 476,668, Mar. 18, 1983, Pat. No. 4,547,559, which is a continuation-in-part of Ser. No. 232,475, Feb. 9, 1981, Pat. No. 4,390,670. This application Oct. 11, 1985, Ser. No. 786,422

Int. Cl.[4] C08F *8/12, 122/02*

U.S. Cl. 524—549 2 Claims



1. A substantially homogeneous copolymer consisting essentially of from about 35 to 65 mole percent acrylic or methacrylic acid repeat units and from about 65 to 35 mole percent maleic acid repeat units and having a number average molecular weight of from about 500 to 5000, or an alkali metal, ammonium or amine salt thereof.

4,710,538

PROCESS FOR THE PRODUCTION OF A STICKY POLYMER

Robert J. Jorgensen, Belle Mead, N.J., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Mar. 10, 1986, Ser. No. 837,215

Int. Cl.[4] C08F *2/34*

U.S. Cl. 525—53 7 Claims

1. A process for the gas phase production of a sticky, but fluidizable, polymer comprising (i) introducing at least one gaseous monomer, which is a precursor for the polymer, into a bed of particles located in a fluidized bed reactor at a velocity sufficient to cause the particles to separate and act as a fluid; (ii) introducing into the bed a catalyst adapted to cause the monomer to polymerize; (iii) contacting the catalyst with the monomer at a temperature below the sticking temperature of the polymer and at a temperature and pressure sufficient to polymerize the monomer in the presence of the catalyst whereby the polymer is produced; and (iv) passing the polymer from the fluidized bed reactor into at least one fluid bed reactor wherein a fluidizing gas is passed through a bed of particles at a velocity sufficient to cause the particles to separate and act as a fluid; the polymer is passed through the fluid bed reactor in an essentially plug flow mode; and the polymer is maintained in an agitated state by mechanical means.

4,710,539

HEAT ACTIVATABLE ADHESIVE OR SEALANT COMPOSITIONS

Bahram Siadat, Boxborough, Mass., and Charles R. Morgan, Brookeville, Md., assignors to W. R. Grace & Co., New York, N.Y.

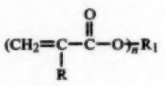
Continuation-in-part of Ser. No. 317,672, Nov. 2, 1981, abandoned. This application Apr. 22, 1983, Ser. No. 487,563

Int. Cl.[4] C08F *210/18, 212/08, 218/08, 220/18*

U.S. Cl. 525—59 3 Claims

1. A heat activatable adhesive or sealant organic resin composition consisting of

(1) a liquid, ethylenically unsaturated monomer, oligomer or prepolymer of the formula:



wherein R is H or CH_3, R_1 is an organic moiety and n is at least 2,

(2) a thermal initiator selected from the group consisting of substituted or unsubstituted pinacols, azo compounds, organic peroxides and mixtures thereof, and

(3) a thermoplastic adhesive material selected from the group consisting of polyvinyl acetals, polyamides, butadiene-acrylonitrile copolymers, styrene-butadiene copolymers, styrene-isoprene copolymers, styrene-ethylene-butylene copolymers, ethylene-vinyl acetate copolymers, ethylene-ethyl acrylate copolymers, ethylene propylene diene monomer and mixtures thereof.

4,710,540

COMPOSITION FOR PREPARING CEMENT-ADHESIVE REINFORCING FIBERS

James J. McAlpin, and Wai Y. Chow, both of Houston, Tex., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Jan. 3, 1986, Ser. No. 816,032

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—101 13 Claims

1. A polyolefin resin from which concrete adherent fibers may be produced, comprising:

from about 95 wt % to about 99 wt % of a olefinic polymer;

from about 1 wt % to about 5 wt % of a modifying agent in intimate admixture with said olefinic polymer, said modi-

fying agent comprising the reaction product resulting from dry blending of an alkylamino alkoxysilane with an acid modified polyolefin in an amount of from about 50 to about 150% of the stoichiometric amount required to react with the acid functionality of the acid modified polyolefin.

4,710,541

PROCESS FOR MOLDING AND VULCANIZING RUBBER PRODUCTS

Seisuke Tomita, Tokorozawa, and Takatsugu Hashimoto, Higashiyamato, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Oct. 22, 1985, Ser. No. 790,228

Claims priority, application Japan, Oct. 22, 1984, 59-221805; Oct. 22, 1984, 59-221806

Int. Cl.[4] C08L *7/00, 9/00, 15/02, 19/00*

U.S. Cl. 525—104 **13 Claims**

1. A curing bladder, comprising:

a rubber compound containing (A) an organic rubber and (B) a polyorganosiloxane, the ratio of (A)/(B) being 95/5 to 5/95, said polyorganosiloxane (B) comprising at least two monovalent substituted or unsubstituted hydrocarbon groups having five or more carbon atoms and 0.05 to 20 mol % of a C=C double bond connected to the silicon atom through at least one carbon atom, and having a degree of polymerization greater than 20.

4,710,542

ALKYLCARBAMYLMETHYLATED AMINO-TRIAZINE CROSSLINKING AGENTS AND CURABLE COMPOSITIONS CONTAINING THE SAME

Peter S. Forgione, and Balwant Singh, both of Stamford, Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 16, 1986, Ser. No. 864,627

Int. Cl.[4] C08L *75/00*

U.S. Cl. 525—127 **8 Claims**

1. A curable composition comprising:

(a) an active hydrogen-containing material;

(b) a triazine compound selected from

(i) a triaminotriazine compound of the formula $C_3N_6(CH_2OR)_{6-x}(CH_2NHCOOR^1)_x$;

(ii) a benzoguanamine compound of the formula $C_3N_5(C_6H_5)(CH_2OR)_{4-y}(CH_2NHCOOR^1)_y$;

(iii) an oligomer of (i) or of (ii); or

(iv) a mixture of at least two of any of (i), (ii) and (iii), wherein the R groups are, independently, hydrogen or alkyl from 1 to 12 carbon atoms, the R^1 groups are, independently, alkyl of from 1 to 20 carbon atoms, x is in the range of from about 2 to about 6, and y is in the range of from about 2 to about 4; and

(c) a cure catalyst.

4,710,543

GLYCIDYL-HYDROXY-ACRYLIC HIGH SOLIDS COATING COMPOSITIONS

Mohinder S. Chattha, Livonia, and Ares N. Theodore, Farmington Hills, both of Mich., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

PCT No. PCT/US82/01089, § 371 Date Aug. 9, 1982, § 102(e) Date Aug. 9, 1982, PCT Pub. No. WO84/00768, PCT Pub. Date Mar. 1, 1984

PCT Filed Aug. 9, 1982, Ser. No. 425,191

Int. Cl.[4] C08L *37/00, 61/24, 61/28*

U.S. Cl. 525—161 **23 Claims**

1. A thermosetting coating composition, characterized in that said composition comprises a mixture of components:

(A) acrylic copolymer bearing pendant epoxide groups and hydroxyl groups and having a number average molecular weight ($\bar{M}_n$) of between about 1000 and about 5000, said copolymer being prepared from a monomer mixture comprising (i) between about 5 and about 35 weight percent of glycidyl ester of a monoethylenically unsaturated carboxylic acid, (ii) between about 5 and about 35 weight percent of hydroxy alkyl acrylate or hydroxy alkyl methacrylate and (iii) between 60 and about 90 weight percent of other monoethylenically unsaturated monomers;

(B) dicarboxylic acid anhydride comprising at least about 50 percent by weight of alkyl hexahydrophthalic anhydride, said dicarboxylic acid anhydride being included in said composition in an amount so as to provide between about 1.0 and about 1.2 anhydride groups for each epoxide group on said acrylic copolymer;

(C) amine-aldehyde crosslinking agent included in said composition in an amount sufficient to provide at least about 0.60 nitrogen crosslinking functional groups for each hydroxyl group initially present in said composition on said copolymer (A); and

(D) solvent,

said coating composition being an essentially unreacted mixture of said components.

4,710,544

THERMOPLASTIC COMPOSITION OF POLYOLEFIN AND HIGH ETHYLENE CONTENT ETHYLENE/ALKYL ACRYLATE ELASTOMER

James R. Wolfe, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 796,589, Nov. 7, 1985. This application Feb. 20, 1987, Ser. No. 17,332

Int. Cl.[4] C08L *23/26, 23/36, 23/04, 23/10*

U.S. Cl. 525—194 **26 Claims**

1. A melt processible thermoplastic composition comprising a blend of:

(A) 15–75 parts by weight of a crystalline polyolefin resin comprising polymerized monomer units of ethylene or propylene or mixtures thereof, and

(B) 25–85 parts by weight of a crosslinked ethylene/alkyl acrylate elastomer made from dynamically crosslinking an ethylene/alkyl acrylate/monoalkyl ester of 1,4-butenedioic acid copolymer containing about 60–90 weight percent ethylene and wherein the alkyl group of the alkyl acrylate contains 1–6 carbon atoms, the dynamically crosslinked elastomer being dispersed throughout the crystalline polyolefin resin.

4,710,545

POLYMER-BOUND ALKYL DIARYLPHOSPHINITE CATALYST COMPOSITIONS AND PROCESSES FOR MAKING SAME

William J. Boyle, Jr., Warren; Frank Mares, Whippany, and Andrea M. Corbo, Randolph, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 636,181, Jul. 31, 1984, Pat. No. 4,581,415, which is a continuation-in-part of Ser. No. 438,686, Nov. 3, 1983, abandoned. This application Aug. 19, 1985, Ser. No. 766,997

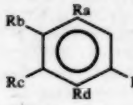
Int. Cl.[4] C08F *8/40*

U.S. Cl. 525—340 **5 Claims**

1. A process for the preparation of a polymeric substance having formula I, p $-C_6H_4-P(Ar')OR$ which comprises the steps of:

(a) contacting a polymer containing aromatic groups with PX_3, in the presence of an effective amount of a Friedel-Crafts catalyst, for a time sufficient to produce a polymer containing aromatic groups substituted with PX_2 wherein X is F, Cl, Br or I;

(b) contacting the polymer containing the aromatic groups substituted with PX_2, in the presence of an effective amount of a Friedel-Crafts catalyst, with an aromatic compound Ar'H having formula:



wherein R_a, R_b, R_c, R_d, and R_e are independently N,N-dialkylamino groups, —N(R^4, R^5), hydrogen, straight or branched chain alkyl groups of 1 to 10 carbons or cycloalkyl groups having 5 to 10 carbons or wherein two of said R_{a-e} groups form part of a fused alicyclic ring and the remainder of said R_{a-e} groups are independently hydrogen, N,N-dialkylamino groups —N(R^4, R^5) alkyl groups having 1 to 10 carbons or cycloalkyl groups having 5 to 10 carbons, or wherein at least one of said R_{a-e} groups is a N,N-dialkylamino group, —N(R^4,R^5), and the remainder of said R_{a-e} groups are independently hydrogen or alkyl or cycloalkyl as defined hereinabove, for a time sufficient to produce a polymer having the formula p —C_6H_4—P-(Ar')X;

(c) contacting the product of step (b) with an aprotic solvent and water in an amount sufficient to produce a polymer having the formula p —C_6H_4—P=O(Ar')H substantially free of residual metal-containing species;

(d) contacting the product of step (c) with PX_3 wherein X is defined as hereinabove in an amount sufficient to produce a polymer having the formula p —C_6H_4—P(Ar')X; and

(e) contacting the product of step (d) with a straight or branched chain alkanol having no more than 10 carbons or cycloalkanol having 5 to 10 carbon atoms in the presence of a base for a time sufficient to produce a polymer having formula p —C_6H_4—P(Ar')OR.

4,710,546

FIBRE-REINFORCED OR FILLED POLYPHENYLENE SULPHIDE CONTAINING TREATED ARAMIDE FIBERS

Karl-Heinz Reichert, and Ingo Koschinski, both of Berlin, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 753,385, Jul. 10, 1985, Pat. No. 4,657,945. This application Oct. 9, 1986, Ser. No. 917,599

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1984, 3426918

Int. Cl.[4] C08G *69/48;* **C08L** *77/10;* **C08K** *9/02*

U.S. Cl. 525—420 **4 Claims**

1. A fiber-reinforced or filled polyphenylene sulphide containing chemically-actived fibers which have been activated by a pretreatment with bromine vapor, chlorine gas, thionyl chloride or ozone wherein the fibers pretreated are aramide fibers.

4,710,547

PROCESS FOR PRODUCING THREE-DIMENSIONALLY CROSSLINKED POLYESTER HAVING THE LIQUID CRYSTAL STRUCTURE

Toshiyuki Uryu, and Takashi Kato, both of Tokyo, Japan, assignors to Celanese Corporation, New York, N.Y.

Filed May 29, 1986, Ser. No. 867,997

Claims priority, application Japan, Sep. 25, 1985, 60-211951

Int. Cl.[4] C08G *63/76*

U.S. Cl. 525—437 **8 Claims**

1. A process for producing a three-dimensionally crosslinked polyester having the liquid crystal structure, said process comprising incorporating a thermotropic liquid crystal polyester (a) which exhibits the anisotropy in the molten state or a polyester composition (b) which is a thermotropic liquid crystal mixture composed of a polyester and a low-molecular weight compound, with a compound (c) having at least three functional groups, whereby crosslinking said polyester (a) or polyester composition (b).

4,710,548

BLENDS OF A POLYCARBONATE WITH A POLYESTER-POLYCARBONATE COPOLYMER

Joseph B. Byrne, Antioch, Calif., assignor to The Dow Chemical Company, Midland, Mich.

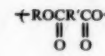
Continuation of Ser. No. 307,135, Sep. 30, 1981, abandoned. This application May 19, 1986, Ser. No. 866,991

Int. Cl.[4] C08L *67/00, 69/00, 67/02*

U.S. Cl. 525—439 **13 Claims**

1. A polyestercarbonate copolymer or terpolymer blend comprising:

(a) from about 1 to about 99 weight percent of at least one normally-solid polyestercarbonate copolymer or terpolymer which contains a plurality of repeating units comprising ester moieties corresponding to the formula



and carbonate moieties corresponding to the formula

wherein each R is independently aromatic hydrocarbylene or inertly-substituted aromatic hydrocarbylene, each R' is independently meta- or para-phenylene and the number of ester and carbonate moieties are selected such that the ratio of ester to carbonate moieties is from 0.05 to 10; and

(b) from about 99 to about 1 weight percent of at least one normally-solid aromatic hydrocarbylene or inertly-substituted aromatic hydrocarbylene polycarbonate resin, with the proviso that the overall ratio of ester to carbonate groups in the polyestercarbonate blend is in the range from about 1:19 to about 7:1 and the Izod impact strength of a blend consisting essentially of components (a) and (b) alone is at least about 4.0 foot-pounds per inch notch at 23° C. when a blend specimen having a 5 mil notch radius is tested otherwise in accordance with ASTM D-256.

4,710,549

CROSS-LINKED PHOSPHAZENE POLYMER

F. Alexander Pettigrew, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Jul. 14, 1986, Ser. No. 885,651

Int. Cl.[4] C08F *283/00*

U.S. Cl. 525—538 **32 Claims**

1. A siloxane cross-linked organophosphazene polymer comprising low molecular weight cyclic organophosphazene containing about 3–7

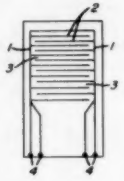
units in which R_1 and R_2 are substituent groups which can be the same or different on each unit and can be the same or different on different units and are selected from the group consisting of alkoxy and araloxy and, prior to cross-linking, an average of at least 1.5 up to 10 olefinically unsaturated groups per molecule, said low molecular weight cyclic organophosphazene being cross-linked through a siloxane bridging group.

4,710,550

METHOD OF USING A DIELECTRIC PROBE TO MONITOR THE CHARACTERISTICS OF A MEDIUM

David E. Kranbuehl, 201 Harrison Ave., Williamsburg, Va. 23185

Division of Ser. No. 729,459, May 1, 1985. This application May 5, 1986, Ser. No. 859,579
Int. Cl.[4] C08F 2/00; G01R 27/02
U.S. Cl. 526—60 8 Claims



1. Method of sensing characteristics of a medium comprising contacting said medium with a probe comprising

(a) a substrate having an electrical conductivity no greater than 10^{-7} mho/cm^{-1} over a frequency range of use, a stable capacitance curve exhibiting little or no hysteresis through the range of one herz to 10 megaherz at the temperatures of use, and a known dielectric permittivity of less than 13, and

(b) at least two chemically resistant, electrically conductive parallel interdigitated electrodes having a width no greater than 0.02 inch affixed thereto, the spaces between the digits of the interdigitated electrodes being no greater than about 0.01 inch, imposing an alternating current across the electrodes thereof, measuring the capacitances and conductance of the medium contacting said probe, and generating an output signal representative of the complex permittivity of the medium as a function of said capacitance and conductance.

4,710,551

PROCESS FOR PRODUCING A VINYL CHLORIDE POLYMER OR COPOLYMER IN AQUEOUS SUSPENSION USING A HYDROTALCITE COMPOUND AS SUSPENSION STABILIZER

Shigeo Miyata, Takamatsu, Japan, assignor to Kyowa Chemical Industry Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1985, Ser. No. 807,246
Int. Cl.[4] C08F 2/18
U.S. Cl. 526—91 6 Claims

1. In a process for producing a polymer or copolymer of a vinyl chloride monomer with or without a comonomer by aqueous suspension polymerization or copolymerization in the presence of a suspension stabilizer and a polymerization initiator which is insoluble or sparingly soluble in water and soluble in the monomer; the improvement comprising carrying out the polymerization or copolymerization in the presence of, as said suspension stabilizer, a hydrotalcite compound of the following formula

$$M_{1-x}^{2+}M_x^{3+}(OH)_2A_{x/n}^{n-}.mH_2O \quad (1)$$

wherein M^{2+} is a divalent cation of a metal selected from the group consisting of Mg, and the combinations of Mg and Zn, and Mg and Cd, M^{3+} is at least one trivalent metal cation, A^{n-} is an anion having a valence of 1 to 4, and x and m represent numbers satisfying the following expressions

$$0<x<0.5 \text{ and } 0 \leqq m<2.$$

4,710,552

PREPARATION OF HOMOPOLYMERS OF ETHENE AND COPOLYMERS OF ETHENE WITH HIGHERα-MONOLEFINS USING A ZIEGLER CATALYST SYSTEM

Robert Bachl, Worms; Volker Warzelhan, Weisenheim; Guenther Schweier, Friedelsheim; Hans Gropper, Ludwigshafen, and Wolfgang Ball, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 666,480, Oct. 30, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 876,299
Claims priority, application Fed. Rep. of Germany, May 10, 1984, 3417238
Int. Cl.[4] C08F 4/64, 210/02
U.S. Cl. 526—116 3 Claims

1. A process for the preparation of copolymers of ethylene with minor amounts of C_3–C_8-α-monoolefins by polymerization of the monomers at from 50° to 125° C. and under a pressure of from 5 to 60 bar, the improvement which comprises using a Ziegler catalyst system comprising

(1) a transition metal catalyst component,

(2) an organoaluminum catalyst component of the formula

$$AlR_3$$

where R is C_2–C_8-alkyl, and

(3) an organohalogen catalyst component (cocatalyst), selected from the group consisting of those of the formulae $CFCl_3$, CCl_4, $CHCl_3$, CH_2Cl_2, CF_2Cl_2, CH_2=CH—CH_2Cl, CCl_2=CCl—CCl_3, CH≡C—CH_2Cl, α-chlorotoluene, α,α-dichlorotoluene, α,α,α-trichlorotoluene, methyl perchlorocrotonate and n-butyl 2,3, 4, 4-tetrachlorobut-2-enoate

with the provisos that the atomic ratio of the transition metal from the catalyst component (1) to aluminum from the catalyst component (2) is from 1:0.2 to 1:50, and the molar ratio of the organoaluminum catalyst component (2) to the organohalogen catalyst component (3) is from 1:0.01 to 1:10, wherein the transition metal catalyst component (1) used is a solid-phase product (VI), obtained by a method in which

(1.1) first

(1.1.1) a finely divided, porous silicon dioxide (I), which has a particle diameter of from 1 to 400 μm, a pore volume of from 1 to 2.5 cm^3/g and a specific surface area of from 200 to 400 m^2/ g and

(1.1.2) a solution (II), as obtained on combining

(11a) 100 parts by weight of a saturated alicyclic oxahydrocarbon of 1 oxa oxygen atom and 4 to 6 carbon atoms an

(11b) from 1 to 50 parts by weight of a mixture of

(11b1) 100 molar parts of a vanadium trihalide/alcohol complex of the formula $VY_3.nZ$-OH, wherein Y is chlorine, n is from 1 to 6, and Z is an alkyl of not more than 6 carbon atoms,

(IIb2) from 0.5 to 100 molar parts of a titanium trichloride or of a titanium trihalide/alcohol complex of the formula $TiY_3.nZOH$, where Y is chlorine, n is from 1 to 6 and Z is an alkyl of not more than 4 carbon atoms and

(IIb3) from 3 to 200 molar parts of a zirconium tetrachloride, are brought into contact with one another to form a suspension (III), with the proviso that the weight ratio of silicon dioxide (I) to transition metal composition (IIb) is from 1:0.2 to 1:1.5, the suspension (III) is evaporated to dryness at below 160° C. and above the melting point of the oxahydrocarbon (IIa) used, a solid-phase intermediate (IV) being formed, and

(1.2) thereafter

(1.2.1) the solid-phase intermediate (IV) obtained from stage (1.1) and

(1.2.2) a solution, in an organic solvent, of an aluminum compound (V) of the formula

$$AlR_mX_{3-m}$$

where X is chlorine, R is C_2–C_8-alkyl, and m is the number 2,

are brought into contact with one another to form a suspension, with the proviso that the weight ratio of the solid-phase intermediate (IV) to the aluminum compound (V) is from 1:0.1 to 1:1, and the resulting suspended solid-phase product (VI) is the transition metal catalyst component (1).

4,710,553
PROCESS FOR THE POLYMERIZATION OR COPOLYMERIZATION OF BUTADIENE

Antonio Carbonaro, Milan; Silvano Gordini, and Salvatore Cucinella, both of San Donato Milanese, all of Italy, assignors to Enichem Elastomeri S.p.A., Palermo, Italy

Filed May 2, 1986, Ser. No. 859,009
Claims priority, application Italy, May 15, 1985, 20715 A/85
Int. Cl.[4] C08F *4/52*
U.S. Cl. 526—142 **23 Claims**

1. In a process for the preparation of 1,4-cis polybutadiene or butadiene copolymers with other related diolefins for the catalytic polymerization or copolymerization of butadiene monomer, in the absence or substantial absence of solvents or diluents, comprising preparing a catalytic mixture by placing in contact in an inert hydrocarbon vehicle the following:

(a) at least one neodymium compound chosen from among neodymium oxide, alcoholates, phenates and carboxylates or mixtures thereof with other rare earth elements;

(b) at least one organic compound containing hydroxyl groups derived from alcohols or phenols or carboxyl groups, with the possible addition of water;

(c) at least one halogen compound, chosen from among secondary or tertiary alcohol halogenides, aryl or alkyl-aryl halogenides, halogenides or organic acids, metallic or organometallic halogenides, and halogens; and

(d) at least one organometallic aluminum compound or relative hydride derivatives thereof; wherein

the quantities of compounds (a) and (b) are such so as to obtain a ratio between hydroxyl groups (including those of water) and/or carboxyl groups and neodymium atoms of 2/1 to 80 and maintaining contact of said components to thereby obtain a catalytic mixture having an aluminum/neodymium ratio of 20/1 to 80/1 and a halogen/neodymium ratio of 0.2/1 to 3/1; feeding said catalytic mixture and liquid butadiene monomer, possibly premixed, in quantities of 10^4 to $4\text{-}10^5$ g.mols of butadiene per g.atom, discontinuously in an agitated polymerization reactor, or continuously in two reactors in series the first of which is homogeneous, or at one end of an elongated reactor in which is carried out the polymerization of the mixture flowing by piston ("plug-flow"), controlling the temperature through the partial evaporation of butadiene monomer from the liquid phase of polymerization, until a mixture with a polymer content of approximately 25 to approximately 70% by weight is obtained, which is discharged from the other end of the reactor; and separating and recovering 1,4-cis polybutadiene from said mixture discharged from the reactor; the improvement comprising carrying out polymerization in two phases, the first phase is carried out at a temperature of between 0° and 30° C. and the second phase is carried out at a temperature of between 50° and 90° C.

4,710,554
POLYBUTADIENE AND PROCESS FOR PREPARING THE SAME

Akio Imai, Ichihara; Yasushi Okamoto, Ibaraki, and Masatoshi Saito, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

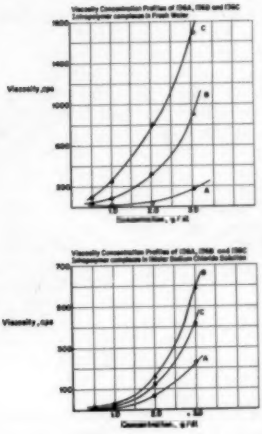
Continuation of Ser. No. 703,896, Feb. 21, 1985, abandoned. This application Feb. 14, 1986, Ser. No. 829,846
Claims priority, application Japan, Feb. 27, 1984, 59-37150
Int. Cl.[4] C08F *4/48*
U.S. Cl. 526—180 **15 Claims**

1. A process for producing a polybutadiene having branched polymer chains, said polybutadiene having an average 1,2-bond content of 18 to 32% by mole, a branched polymer chain content of 60% by weight or more and a Mooney viscosity at 100° C. of 40 to 90, the viscosity of a 5% by weight concentration solution of the polybutadiene in styrene at 25° C. being 60 to 90 cps, said process comprising starting the polymerization of 1,3-butadiene in an inert hydrocarbon solvent in the presence of a Lewis basic compound and an organomonolithium compound in an amount of 0.5 to 3 millimoles per 100 g of 1,3-butadiene at a temperature selected from the range of 30° to 40° C., conducting the polymerization while controlling the temperature so that the temperature at the end of the polymerization may be 20° to 40° C. higher than the temperature at the start of the polymerization, and adding to the resulting polymer solution of a polyfunctional halogen compound in an amount of 0.6 to 1 equivalent per equivalent of the organomonolithium compound to effect further reaction thereof.

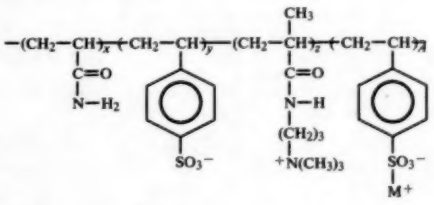
4,710,555
NOVEL POLYAMPHOLYTE COMPOSITIONS POSSESSING HIGH DEGREES OF ACID, BASE, OR SALT TOLERANCE IN SOLUTION

Dennis G. Peiffer, East Brunswick, and Robert D. Lundberg, Bridgewater, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 688,238, Jan. 2, 1985, abandoned. This application Feb. 5, 1986, Ser. No. 826,229
Int. Cl.[4] C08F *230/04*
U.S. Cl. 526—240 **11 Claims**



1. A terpolymer having the formula:



wherein x is 1 to 50 mole %, y is 1 to 50 mole %, z is 1 to 50 mole %, y is equal to z, A is 1 to 25 mole %, wherein A, y and z are less than 50 mole % and the ratio of A/y+z is 0.25 to 15, and M is selected from the group consisting of amines and a metallic cation being selected from the group consisting of lead, iron, aluminum, Groups IA, IIA, IB and IIB of the Periodic Table of Elements.

4,710,556

PROCESS FOR PREPARING COPOLYMERS AND USE OF THE PRODUCTS OBTAINED

Helmut Plum, Taunusstein, Fed. Rep. of Germany, assignor to Hoechst AG, Fed. Rep. of Germany

Filed Oct. 28, 1983, Ser. No. 546,577

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1981, 3101887

Int. Cl.[4] C08F *18/14*

U.S. Cl. 526—273 **13 Claims**

1. A process for preparing copolymers which comprises copolymerizing in a radical bulk polymerization the following components:

(A) between 10 and 60 parts by weight of at least one diester of an α,β-olefinically unsaturated dicarboxylic acid with a monohydric alcohol having 1 to 8 carbon atoms in each ester group,

(B) between 10 and 70 parts by weight of at least one vinyl derivative of a monocyclic aromatic hydrocarbon having but one vinyl group, in which any alkyl groups optionally in α-position or attached to the aromatic ring system have from 1 to 3 carbon atoms;

(C) between 0 and 30 parts by weight of at least one glycidyl ester of an aliphatic saturated monocarboxylic acid being branched in α-position, the acid having from 9 to 11 carbon atoms,

(D) between 0 and less than 51 parts by weight of at least one ester or amide of at least one α,β-olefinically unsaturated monocarboxylic acid or an anhydride of at least one α,β-olefinically unsaturated dicarboxylic acid,

(E) between 0 and 40 parts by weight of at least one α,β-olefinically unsaturated monocarboxylic acid,

wherein at least one of Components (D) and (E) is present, the total amount of Components (A) to (E) is 100 parts by weight, the polymerization is effected by introducing at first at least one part of Component A into the reaction vessel alone or in combination with at least a part of Component (C), heating the contents of the vessel to a temperature in the range between 140° and 200° C. and then copolymerizing by gradually adding a mixture of Component (B) with at least one of Components (D) and (E) or a combination of said mixture with remaining parts, if any, of Component A or of Components (C) and (A) or a combination of said mixture with the whole part of Component (C) into said vessel together with a radical initiator alone or in combination with a molecular weight regulator and wherein, if Component (C) is present, an at least equimolar amount, referred to Component (C), of Component (E) is added.

4,710,557

POLYMERS OF THIOPHENYL THIOACRYLATE AND THIOMETHACRYLATE MONOMERS

David P. Warren, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

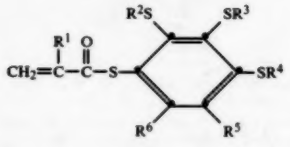
Division of Ser. No. 697,554, Feb. 1, 1985, Pat. No. 4,606,864. This application Aug. 14, 1986, Ser. No. 896,553

Int. Cl.[4] C08F *28/04*

U.S. Cl. 526—289 **14 Claims**

1. A polymer comprising

(a) 5 to 100 mole percent of recurring units derived from a monomer having the formula:



wherein:

R^1 is H or methyl;

R^2, R^3 and R^4 are alkyl; and

R^5 and R^6 are thioalkyl; and

(b) 0 to 95 mole percent of a polymerized copolymerizable ethylenically unsaturated monomer; said polymer having an index of refraction greater than 1.7.

4,710,558

PROCESS FOR STABILIZING ORGANOPOLYSILOXANES

Reinhard Jira, Burghausen, and Ralph Ottlinger, Murnau, both of Fed. Rep. of Germany, assignors to Wacker Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 1, 1986, Ser. No. 891,997

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535379

Int. Cl.[4] C08G *77/06*

U.S. Cl. 528—14 **10 Claims**

1. A process for stabilizing organopolysiloxanes against viscosity changes which contain alkaline compounds selected from the group consisting of alkali metal hydroxides, alkali metal silanolates, and alkali metal siloxanolates or a mixture of at least two of such alkaline compounds which comprises neutralizing the alkaline compounds with a neutralizing agent selected from the group consisting of a compound consisting of carbon, hydrogen and oxygen atoms, in which 2, 3 or 4 hydrocarbon groups are bonded to the same carbon atoms via oxygen, a compound consisting of carbon, hydrogen, oxygen and at least one halogen atom, in which 2, 3 or 4 hydrocarbon groups are bonded to the same carbon atom via oxygen, and an acylacetic acid ester in which the neutralizing agent is a liquid at room temperature at 1020 hPa (abs) and has a boiling point up 200° C. at 1020 hPa (abs.).

4,710,559

HEAT CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

James F. Essinger, Jr., Adrian, Mich., assignor to Wacker Silicones Corporation, Adrian, Mich.

Filed Dec. 22, 1986, Ser. No. 945,132

Int. Cl.[4] C08G *77/06*

U.S. Cl. 528—15 **17 Claims**

1. A heat curable organopolysiloxane composition comprising (a) an organopolysiloxane having an average of at least two aliphatically unsaturated hydrocarbon radicals per molecule, (b) an organohydrogenpolysiloxane having an average of at least two Si-bonded hydrogen atoms per molecule, (c) a platinum catalyst capable of promoting the addition of the Si-bonded hydrogen atoms to the aliphatically unsaturated hydrocarbon radicals and (d) a hydrazone compound.

4,710,560

POLYURETHANE COATING COMPOSITION

Cung Vu, Gaithersburg, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed Sep. 8, 1986, Ser. No. 904,732

Int. Cl.[4] C08G *18/12*

U.S. Cl. 528—67 **16 Claims**

1. A moisture-curable composition comprising an isocyanate terminated, branched prepolymer which is the reaction product of

(a) an alcohol having two or three —OH groups,

(b) a hydrophobic polymer diol or triol, and

(c) at least one polyisocyanate,

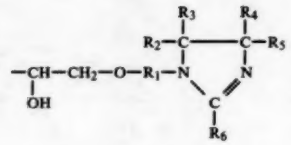
said prepolymer having an NCO content in the range 0.3 to 1.0 meq/g, the mole ratio of (a), (b) and (c) being in the range 1:2.6–6.0:4.6–9, respectively.

4,710,561
[POLY]IMIDAZOLINE ADDUCT FOR ELECTROCOATING

Akira Tominaga, and Reiziro Nishida, both of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed Nov. 26, 1986, Ser. No. 935,306
Claims priority, application Japan, Nov. 27, 1985, 60-265101
Int. Cl.[4] C08G *59/64*
U.S. Cl. 528—111 **20 Claims**

1. A resin coating composition comprising an epoxy resin derivative having an imidazoline ring functional group of the formula

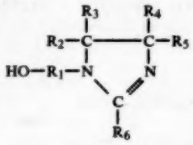


(I)

wherein R_1 represents an alkylene group having 2 to 6 carbon atoms, each of R_2, R_3, R_4 and R_5 represents a hydrogen atom or a methyl group, and R_6 represents a residue of a carboxylic acid,

as a rest binder.

2. A resin coating composition of claim 1 wherein the group of formula (I) is an imidazoline ring functional group obtained by reacting the 1,2-epoxy groups of an epoxy resin with an N-hydroxyimidazoline of the formula



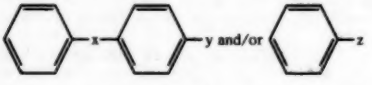
wherein R_1, R_2, R_3, R_4, R_5 and R_6 are as defined in claim 1.

4,710,562
STABILIZING POLYARYLETHERKETONES

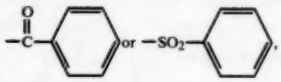
Louis M. Maresca, Belle Mead, N.J., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 710,118, Mar. 11, 1985, abandoned. This application May 27, 1986, Ser. No. 867,619
Int. Cl.[4] C08G *8/02, 14/00*
U.S. Cl. 528—125 **9 Claims**

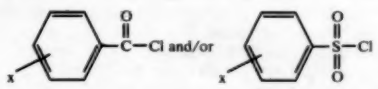
1. A method of stabilizing poly(aryl ether ketones) produced by reacting a nucleophilic coreactant with an electrophilic coreactant under heterogeneous polymerization conditions in the presence of a Friedel-Crafts catalyst at a temperature of from about 0° to about 160° C. in an organic solvent, which comprises adding a nucleophilic and/or an electrophilic capping agent during the polymerization, said nucleophilic capping agent being of the following formula:



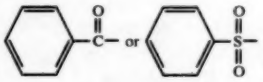
wherein x is a covalent bond, —O—, —S—, or —CR_2—, wherein each R is independently hydrogen, C_1 to C_{10} alkyl, C_1 to C_{10} fluoroalkyl, phenyl or an electron withdrawing group substituted phenyl, y is NO_2,



and z is halogen, alkyl or alkoxy; said electrophilic capping agent being of the following formula:



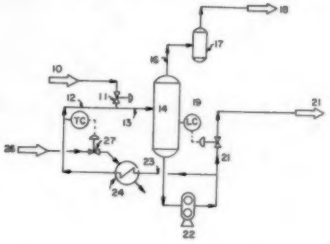
wherein x is halogen, alkyl, alkoxy, nitro,



4,710,563
PROCESS FOR THE RECOVERY OF AMORPHOUS DEVAPORIZED POLYALPHAOLEFIN

Steven L. Oetting, Midland, Tex., assignor to El Paso Products Company, Odessa, Tex.

Filed Aug. 15, 1986, Ser. No. 896,793
Int. Cl.[4] C08F *6/26, 6/28*
U.S. Cl. 528—501 **3 Claims**



1. A process for the production of a polyalphaolefin in fluid form which comprises:

(a) withdrawing from a bulk polymerization zone maintained at a temperature between about 130° F. and about 175° F. and at a pressure between about 400 psig and about 550 psig through a valve a reactor effluent comprised of amorphous polyalphaolefin and liquid unreacted monomer;

(b) directly contacting said effluent immediately upon withdrawal through said valve with a heated devaporized amorphous polyalphaolefin obtained in step (f) below and having a temperature in the range from about 350° F. to about 425° F.;

(c) passing the resulting mixture from step (b) to a flash zone maintained at a pressure from about 40 to about 80 psig and a temperature between about 300° F. and about 375° F.;

(d) withdrawing a vapor stream of unreacted monomer from said flash zone;

(e) withdrawing devaporized amorphous polyalphaolefin from said flash zone;

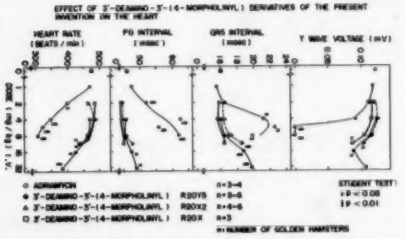
(f) heating a portion of said devaporized polyalphaolefin from step (e) by indirect heat exchange and passing the heated portion to step (b) above, and

(g) recovering the remaining portion of said devaporized polyalphaolefin from Step (e) as the product of the process.

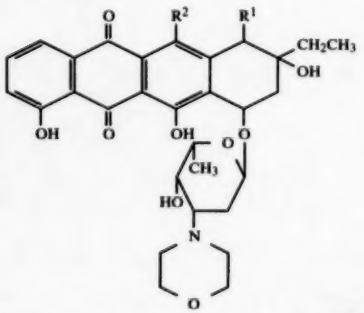
4,710,564
ANTHRACYCLINE COMPOUNDS

Noboru Otake, Yokohama; Kuniaki Tatsuta; Shigeyuki Mizobuchi, both of Tokyo; Nobuyasu Komeshima, Maebashi; Shohachi Nakajima, Maebashi; Hiroyuki Kawai, Maebashi, and Atsuo Odagawa, Maebashi, all of Japan, assignors to Microbial Chemistry Research Foundation, Tokyo, Japan

Filed Jan. 14, 1986, Ser. No. 818,867
Claims priority, application Japan, Jan. 18, 1985, 60-7196; Mar. 1, 1985, 60-40866
Int. Cl.[4] C07H *15/24*
U.S. Cl. 536—6.4 **3 Claims**



1. An anthracycline compound of the formula


(I)

wherein R^1 and R^2 are at the same time both hydroxyl groups, or both hydrogen atoms or an acid addition salt thereof.

4,710,565
THESIS OF 7-HALO-7-DEOXYLINCOMYCINS

Douglas A. Livingston, Kalamazoo, and Janet E. Petre, Portage, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 676,157, Nov. 29, 1984, abandoned. This application Jan. 24, 1986, Ser. No. 822,044
Int. Cl.[4] C07H *5/10*
U.S. Cl. 536—16.5 **15 Claims**

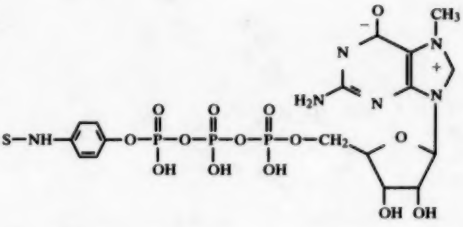
1. A process for preparing a compound selected from the group consisting of 7-halo-7-deoxylincomycin and analogs thereof which comprises reacting a compound selected from the group consisting of lincomycin and analogs thereof with thionyl halide and dimethylformamide under mild conditions.

4,710,566
PURIFICATION OF THE MESSENGER RNA CAP-BINDING PROTEIN

John W. Kozarich, College Park, Md., and Robert E. Rhoads, Lexington, Ky., assignors to Yale University, New Haven, Conn.

Filed Dec. 27, 1984, Ser. No. 686,708
Int. Cl.[4] C07H *19/06, 19/10, 19/16*
U.S. Cl. 536—28 **3 Claims**

2. A compound of the formula



where S is Sepharose.

4,710,567
SEPARATION AND PURIFICATION OF SUGAR ESTERS SYNTHESIZED FROM BOTH AQUEOUS AND NONAQUEOUS SYSTEMS

Sandra Kea, and Charles E. Walker, both of Lincoln, Nebr., assignors to Nebraska Department of Economic Development, State of Nebraska, Lincoln, Nebr.

Continuation-in-part of Ser. No. 639,783, Aug. 10, 1984. This application Jun. 4, 1985, Ser. No. 741,229
The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.
Int. Cl.[4] C07H *1/00*
U.S. Cl. 536—119 **31 Claims**

4. A method of separating and purifying raw sugar esters from a mixture which comprises:

(a) mixing the raw sugar ester with an aqueous salt solution;

(b) adding an organic extraction solvent to said aqueous mixture;

(c) mixing said organic extraction solvent into said aqueous mixture;

(d) allowing the aqueous mixture of organic extraction solvent, salt solution and raw sugar ester to stand whereby three layers are formed;

(e) separating said extraction solvent from said aqueous mixture; and

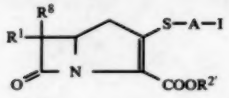
(f) separating and purifying said sugar esters from said extraction solvent.

4,710,568
CARBAPENEM ANTIBIOTICS

Choung Un. Kim, Madison, and Peter F. Misco, Jr., Durham, both of Conn., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 766,624, Aug. 19, 1985, which is a division of Ser. No. 471,379, Mar. 8, 1983, Pat. No. 4,552,696, which is a continuation-in-part of Ser. No. 366,910, Apr. 9, 1982, abandoned. This application Oct. 30, 1986, Ser. No. 925,026
Int. Cl.[4] C07D *487/04;* **A61K** *31/40*
U.S. Cl. 540—350 **4 Claims**

1. An intermediate of the formula



wherein R^8 is hydrogen and R^1 is

A is cyclopentylene, cyclohexylene or C_2–C_6 alkylene optionally substituted by one or more C_1–C_4 alkyl groups; and $R^{2'}$ is a conventional readily removable carboxyl protecting group.

4,710,569

BASIC DYESTUFFS

Günter Franke, Leichlingen; Dieter Ockelmann, Cologne; Roderich Raue, Leverkusen, and Peter Wild, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

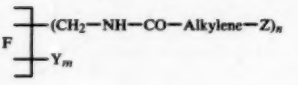
Filed Sep. 10, 1985, Ser. No. 774,273

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1984, 3433545

Int. Cl.[4] C09B *19/00, 19/02*

U.S. Cl. 544—31 **4 Claims**

1. A dyestuff of the formula

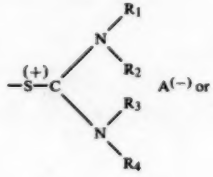


(I)

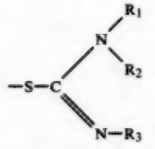
in which

F is an azine, phthalocyanine or quinophthalone chromophore,

Z is a radical of the formula



A(−) or



R_1–R_4 each is hydrogen, alkyl, cycloalkyl, alkenyl, aryl, aralkyl or a heterocyclic structure or

R_2 and R_3 are an optionally substituted amino group or together form a ring or

R_1 with R_2 and/or R_3 with R_4 form a ring,

$A^{(-)}$ is an anion,

Y is an anionic group,

m is 0–2 and

n is 1–6,

and wherein the chromophore and said radicals can carry further substituents provided that the total number of anionic substituents is smaller than the total number of quaternary and quaternizable amino groups.

4,710,570

AZINE REDOX DYES AND LEUCO AZINE DYES

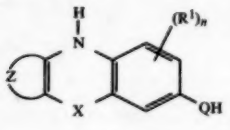
Tran V. Thien, Harlow, United Kingdom, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 30, 1985, Ser. No. 781,913

Int. Cl.[4] C07D *265/38, 279/20*

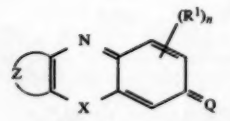
U.S. Cl. 544—31 **12 Claims**

1. A compound of the general formula:



I

or



II

in which:

X represents O or S;

Z represents the necessary atoms to complete a fused aromatic or heterocyclic ring system, which may be polynuclear, of up to 16 skeletal atoms selected from carbon and nitrogen;

n is 0 or 1;

R^1 represents an alkyl or aromatic sulphonyl group, containing up to 15 skeletal atoms selected from carbon, nitrogen, oxygen, and sulphur;

Q represents CR^4R^5

in which

R^4 and R^5 each contain up to 20 skeletal atoms selected from carbon, nitrogen, oxygen and sulphur, at least one of R^4 and R^5 is selected from the group consisting of electronegative groups selected from the group consisting of carbonyl, cyano and sulphonyl groups, and substituted aryl groups, and the other of R^4 and R^5 may additionally be selected from aryl, alkoxy, thioalkoxy, alkylamino and arylamino, or R^4 and R^5 together comprise the necessary atoms to form a 5-membered α-oxoheterocyclic ring, and when X represents O, R^4 and R^5 together may additionally comprise the necessary atoms to form a 6-membered α-oxoheterocyclic ring.

4,710,571

1H-IMIDAZOL-1-ETHANOL ESTERS

Petrus S. Hofman, Haarlem; David W. R. Hall, Rotterdam, and Kapil D. Jaitly, GL Delft, all of Netherlands, assignors to Gist-Brocades N.V., Delft, Netherlands

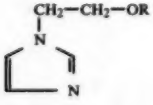
Continuation of Ser. No. 772,721, Sep. 4, 1986, abandoned, which is a division of Ser. No. 604,083, Apr. 26, 1984, Pat. No. 4,563,473. This application Aug. 25, 1986, Ser. No. 899,920

Claims priority, application Netherlands, May 3, 1983, 8301550

Int. Cl.[4] C07D *403/12, 409/12*

U.S. Cl. 544—216 **9 Claims**

1. A compound selected from the group consisting of compounds of the formula



wherein R is an acyl of an organic carboxylic acid having at

least 5 carbon atoms free of additional carboxyl groups selected from the group consisting of benzoyl optionally substituted with at least one member of the group consisting of alkyl and alkoxy of 1 to 6 carbon atoms, chlorine, bromine and iodine, phenylalkanoyl of 1 to 4 alkyl carbon atoms optionally substituted on the phenyl with at least one member of the group consisting of alkyl and alkoxy of 1 to 6 carbon atoms, chlorine, bromine and iodine,

and A is a 5- or 6-member aromatic heterocycle ring containing oxygen, nitrogen or sulfur, and acyl of an alkanoic acid of 5 to 18 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

4,710,572

HISTAMINE H_1 ANTAGONISTS

Magid A. Abou-Gharbia, and Susan T. Nielsen, both of Wilmington, Del., assignors to American Home Products Corporation, New York, N.Y.

Filed Jul. 30, 1986, Ser. No. 892,159
Int. Cl.[4] C07D *473/08*; A61K *31/52*
U.S. Cl. 544—267 **1 Claim**

1. The compound which is 7-[3-[4-bis(4-fluorophenyl)methyl]-1-piperazinyl]propyl-3,7-dihydro-1,3-dimethyl-1H-purine-2,6-dione or a pharmaceutically acceptable salt thereof.

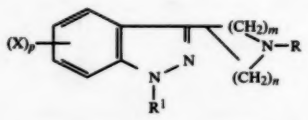
4,710,573

3-(PIPERIDINYL)-AND 3-(PYRROLIDINYL)-1H-INDAZOLES

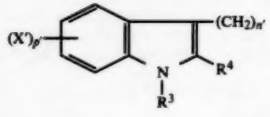
Joseph T. Strupczewski, Flemington, N.J., assignor to Hoechst Roussel Pharmaceuticals, Inc., Somerville, N.J.

Division of Ser. No. 811,090, Dec. 19, 1985, Pat. No. 4,670,447, which is a continuation-in-part of Ser. No. 694,198, Jan. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 679,662, Dec. 7, 1984, abandoned, which is a continuation-in-part of Ser. No. 525,088, Aug. 22, 1983, abandoned. This application Mar. 19, 1987, Ser. No. 37,194
Int. Cl.[4] C07D *401/14, 403/14*
U.S. Cl. 546—199 **1 Claim**

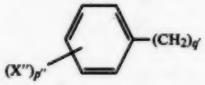
1. A compound of the formula



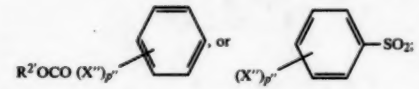
wherein R is



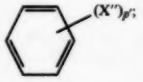
and R^1 is hydrogen, loweralkyl, loweralkenyl, lowercycloalkylloweralkyl,



dilloweralkylaminoloweralkyl, cyano, cyanomethyl, formyl, loweralkanoyl, hydroxymethyl, hydroxyloweralkyl, lowercycloalkylloweralkanoyl, loweralkoxycarbonylloweralkyl,



$R^{2'}$ is loweralkyl, 2,2,2-trichloroethyl, phenyl or



R^3 and R^4 are independently hydrogen or loweralkyl; X, X' and X'' are independently hydrogen, halogen, loweralkyl, loweralkoxy, loweralkanoyl, loweralkylthio, cyano, carbamoyl, hydroxy, nitro, amino or trifluoromethyl; m is 2 or 3, n is 1 or 2, and the sum of m and n is 3 or 4; n' is 2 or 3; p, p' and p'' are independently 1 or 2 except when x'' is halogen p'' is 1 through 5; and q' is 1, 2, 3 or 4; the optical antipode thereof; or the pharmaceutically acceptable salt thereof.

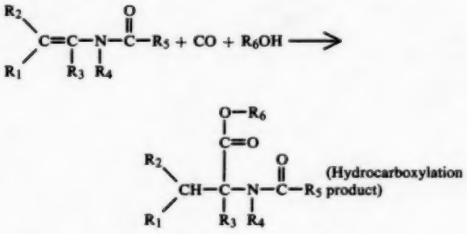
4,710,574

α-AMINO ACIDS THROUGH CATALYTIC REACTION OF CO AND A HYDROXYL COMPOUND WITH ENAMIDES

Mark C. Cesa, South Euclid, and James D. Burrington, Richmond Heights, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Nov. 16, 1983, Ser. No. 552,561
Int. Cl.[4] C07D *207/16*
U.S. Cl. 548—533 **1 Claim**

1. A process for making a compound hydrolyzable to an α-amino acid which comprises reacting an enamide with CO and water or an organic hydroxyl compound according to the equation



wherein R_1 and R_3 are H, each of R_2 and R_4 is a $-CH_2-$ group, and wherein each of R_5 and R_6 contains no ethylenic or acetylenic unsaturation, contains zero to 15 carbon atoms and are independently selected from;

(1) H or a hydrocarbyl group,

(2) a hydrocarbyl group substituted with acylamino, acyl-(N-hydrocarbyl) amino, formylamino and formyl-(N-hydrocarbyl) amino, hydrocarbyloxy, hydrocarbylthio, acyloxy, acylthio, carboxyl, hydrocarbyl carboxyl, hydrocarbyl thiocarboxyl, hydrocarbyl amino, dihydrocarbyl amino, hydrocarbonyl, hydrocarbyl carbonyl, 3-indolyl, carbomoyl hydrocarbylcarbamoyl, dihydrocarbylcarbamoyl, 5-imidazolyl, 2-guanidinoyl and halo groups, and wherein R_4 is linked with R_2 to form a ring.

4,710,575

BISNEOPENTYL ALKYL ORGANOMETALLIC COMPOUNDS AND METHODS OF PREPARING SAME

Orville T. Beachley, Jr., Buffalo, N.Y., assignor to The Research Foundation of State University of New York, Albany, N.Y.

Continuation-in-part of Ser. No. 673,836, Nov. 21, 1984, Pat. No. 4,621,147. This application Aug. 8, 1986, Ser. No. 894,571

Int. Cl.[4] C07F 5/00

U.S. Cl. 556—1 3 Claims

1. $M[CH_2.C(CH_3)_3]X$ where X is chloro, bromo or iodo and M is selected from the group consisting of gallium and indium.

4,710,576

THERMOCHROMIC ARSENIC AND ANTIMONY COMPOUNDS

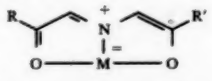
Anthony J. Arduengo, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 19, 1986, Ser. No. 830,840

Int. Cl.[4] C07F 9/68, 9/90

U.S. Cl. 556—40 9 Claims

1. A compound having the formula



wherein R and R′ are selected from the group consisting of

(a) substituents having the formula $R^1R^2R^3C$-wherein R^1 is H or an alkyl groups of 1 to 6 carbon atoms, and R^2 and R^3 are independently alkyl of 1 to 6 carbon atoms;

(b) phenyl group;

(c) phenyl group substituted by Br, Cl, F, alkyl group of 1 to 10 carbon atoms, or alkoxy group of 1 to 10 carbon atoms; and

(d) an adamantyl group; and M is As or Sb; with the proviso that when R and R′ are phenyl or substituted phenyl in which the substituents are in meta or para positions, M is As.

4,710,577

CYTOSTATIC PLATINUM ORGANIC COMPLEXES

Yoshinori Kidani, 2-718, Mataho-kodan jutaku, 2-1 Mataho-cho, Nishi-ku, Nagoya-shi, Aichi-ken, and Masahide Noji, 184-5, Aza Fukazawa, Ohaza Kikko, Moriyama-ku, Nagoya-shi, Aichi-ken, both of Japan

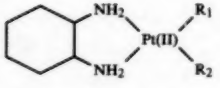
Filed Aug. 3, 1984, Ser. No. 637,463

Claims priority, application Japan, Aug. 5, 1983, 58-143405; Nov. 2, 1983, 58-206215

Int. Cl.[4] C07F 15/00

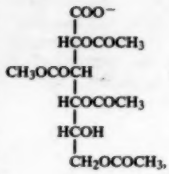
U.S. Cl. 556—137 7 Claims

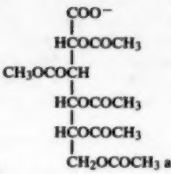
1. 1,2-Diaminocyclohexane platinum (II) complexes of the general formula:



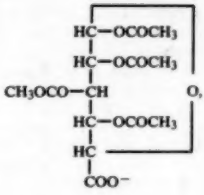
(I)

wherein R_1 and R_2, which may be the same or different, are selected from NO_3^-, $MOOC(CHOH)_2COO^-$(wherein M is an alkali metal),

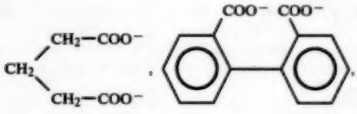


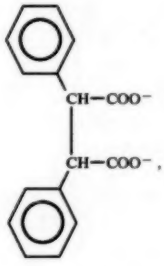


and



or R_1 and R_2 may together represent $-OOC(CHOH)_4COO^-$, $-OOC-CH=CH-COO^-$,





or $-OOC(CHOCOCH_3)_4COO^-$, (with the proviso that R_1 and R_2 are not both NO_3), the configuration of the 1,2-diaminocyclohexane (DACH) being selected from cis, trans-d and trans-1, or mixtures of any of these.

4,710,578

ISOTHIURONIUM SALTS

Csaba Vértesi; Attila Molnár, and Lajos Guczoghy, all of Budapest, Hungary, assignors to Peremartoni Vegyipari Vallalat, Peremartongyartelep, Hungary

PCT No. PCT/HU85/00022, § 371 Date Nov. 25, 1985, § 102(e) Date Nov. 25, 1985, PCT Pub. No. WO85/04399, PCT Pub. Date Oct. 10, 1985

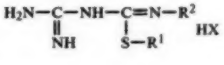
PCT Filed Apr. 2, 1985, Ser. No. 809,888

Claims priority, application Hungary, Apr. 3, 1984, 1324/84; Mar. 19, 1985, 1324/84

Int. Cl.[4] C07C 157/14

U.S. Cl. 558—4 13 Claims

1. A salt of the Formula (I)



wherein

R^1 is allyl, 2-chloroethyl, 2-chloro-2-hydroxypropyl, 3-chloropropyl, 2-hydroxyethyl, glycidyl, 2-bromoethyl, 3-bromopropyl, 3-hydroxypropyl, 3-mercapto-propyl, propargyl, methallyl, or 1-chloro-2-hydroxy-propyl;

R^2 is hydrogen, C_1 to C_6 alkyl, C_2 to C_6 alkenyl, C_2 to C_6 alkynyl, or C_3 to C_6 cycloalkyl; and

X is halide.

4,710,579

2-(ACETOACETYLOXY)-3-(OCTADECYLOXY)PROPYL-3-TRIMETHYLAMMONIOPROPYL PHOSPHATE OR A PHARMACEUTICALLY ACCEPTABLE SALT THEREOF

Shoshichi Nojima, Tokyo; Hiroaki Nomura, and Tetsuya Okutani, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Oct. 30, 1985, Ser. No. 792,878

Claims priority, application Japan, Nov. 9, 1984, 59-237271; Apr. 19, 1985, 60-84781

Int. Cl.[4] C07F *9/10*

U.S. Cl. 558—169 2 Claims

1. 2-(Acetoacetyloxy)-3-(octadecyloxy)propyl 3-trimethylammoniopropyl phosphate.

4,710,580

2-[1,3,2-DIOXAPHOSPHOLAN-2-YLOXY]ETHYL COMPOUNDS

William H. McGregor, Malvern, and Joseph Y. Chang, Berwyn, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Aug. 12, 1986, Ser. No. 895,779

Int. Cl.[4] C07F *9/15*

U.S. Cl. 558—86 4 Claims

1. A compound having the formula

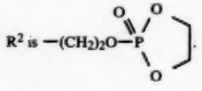
$$R^1—X$$

wherein

R^1 is alkyl of 8–22 carbon atoms;

X is

$$—NHC(=O)—O—R^2,\ —NHC(=O)—NH—R^2 \text{ or } —SO_2NH—R^2 \text{ and}$$



R^2 is $—(CH_2)_2O—P$ (cyclic phosphate)

4,710,581

NUCLEOPHILIC SUBSTITUTION PROCESS

G. Patrick Stahly, and Barbara C. Stahly, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

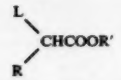
Division of Ser. No. 640,004, Aug. 10, 1984, Pat. No. 4,581,463, which is a continuation-in-part of Ser. No. 452,517, Dec. 23, 1982, abandoned, and a continuation-in-part of Ser. No. 452,617, Dec. 23, 1982, abandoned, said Ser. No. 452,517, is a continuation-in-part of Ser. No. 419,341, Sep. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 312,176, Oct. 16, 1981, abandoned, said Ser. No. 452,617, is a continuation-in-part of Ser. No. 419,344, Sep. 17, 1982, abandoned. This application Oct. 3, 1985, Ser. No. 783,419

The portion of the term of this patent subsequent to Apr. 8, 2003, has been disclaimed.

Int. Cl.[4] C07C *79/46*

U.S. Cl. 560—20 12 Claims

1. A process which comprises reacting a halonitroaromatic compound with an alpha,alpha-disubstituted acetic acid ester corresponding to the formula:



wherein L is halo, R is hydrocarbyl, and R′ is alkyl in an inert solvent and in the presence of a base so as to form a halonitroarylacetic acid ester by effecting a nucleophilic substitution of the ester reagent on an unsubstituted ring carbon of the halonitroaromatic compound during which the alpha-halo substituent functions as a leaving group.

4,710,582

HERBICIDALLY ACTIVE SUBSTITUTED DIPHENYL ETHER OXIME DERIVATIVES

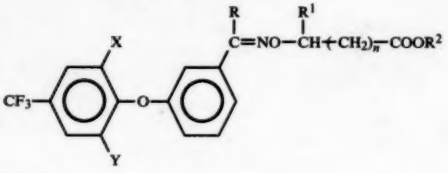
James G. Phillips, Medina, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jul. 14, 1986, Ser. No. 885,359

Int. Cl.[4] C07C *101/00*

U.S. Cl. 560—35 5 Claims

1. A compound of the formula:



wherein:

X and Y are the same or different halogen;

R is hydrogen, halogen, cyano, C_1 to C_4 alkyl or haloalkyl, C_1 to C_4 alkoxy or alkylthio, or mono or dialkylamino;

R^1 is hydrogen or C_1 to C_4 alkyl;

R^2 is hydrogen or up to C_{10} alkyl, haloalkyl, cycloalkyl, alkenyl, alkynyl, alkoxyalkyl or phenyl, substituted phenyl, benzyl or substituted benzyl; and

n is 0, 1, 2 or 3.

4,710,583

DIPEPTIDES AND PROCESS

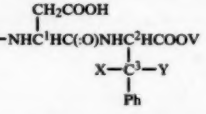
Alan B. Chmurny, Frederick; Akiva T. Gross, Rockville; Robert J. Kupper, Mount Airy, and Rowena L. Roberts, Derwood, all of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Oct. 21, 1985, Ser. No. 789,595

Int. Cl.[4] C07C *101/32;* C12P *21/02;* A61K *37/02*

U.S. Cl. 560—40 19 Claims

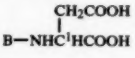
1. Process for producing a dipeptide of the formula



wherein B represents hydrogen or Q; Q represents an amino acid protective group; V represents hydrogen or an alkyl group having 1, 2, 3, or 4 carbon atoms; C^1 and C^2 have the common natural configuration of naturally occurring amino acids; and Y is hydrogen and X is chloro or hydroxyl,

said process comprising:

reacting B-substituted aspartic acid of the formula



wherein X, Y, and V are as defined above and the C^2 carbon has the common natural configuration of naturally occurring amino acids;

said reaction being conducted in

(d) a water-immiscible solvent in the presence of a metallo-proteinase,

(e) a water-miscible solvent in the presence of a non-metallo-proteinase, or

(f) a water-immiscible solvent in the presence of a non-metallo-proteinase.

4,710,584

DERIVATIVES OF 3-BENZYLIDENE CAMPHOR, PROCESS FOR THEIR PREPARATION AND THEIR USE AS PROTECTIVE AGENTS AGAINST UV RAYS AND AS MEDICAMENTS

Gerard Lang, Saint Gratien; Serge Forestier, Claye Souilly, and Alain LaGrange, Chatou, all of France, assignors to L'Oreal, Paris, France

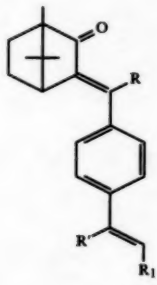
Filed Dec. 11, 1984, Ser. No. 680,559

Claims priority, application Luxembourg, Dec. 14, 1983, 85139

Int. Cl.⁴ C07L *69/76, 143/52*

U.S. Cl. 560—51 **27 Claims**

1. A compound consisting of a derivative of 3-benzylidene camphor of the formula:



(I)

in which

R is a hydrogen atom, a methyl radical or an ethyl radical,

R′ is a hydrogen atom, a methyl radical or an ethyl radical, with the proviso that if one of R and R′ is a hydrogen atom, the other of R and R′ is a methyl radical or an ethyl radical,

R_1 is a $-COOR_2$, $-CONHR_2$, $-COO^-M^+$, $-CHO$, $-CH(OR_4)_2$ or $-CH_2OR_4$ group,

R_2 is an alkyl, alkenyl, cycloalkyl or aralkyl radical containing at most 20 carbon atoms or said alkyl, alkenyl, cycloalkyl or aralkyl radical, substituted by hydroxy, alkoxy, amine or quaternary ammonium groups,

M is a hydrogen atom, an alkali metal or a $N^+(R_3)_4$ group, R_3 being a hydrogen atom or a C_1 to C_4 alkyl or hydroxyalkyl radical, and

R_4 is a hydrogen atom or an alkyl, cycloalkyl or aralkyl radical containing at most 20 carbon atoms.

4,710,585

LIQUID CRYSTAL COMPOUND

Masaaki Taguchi, Tokyo, and Hitoshi Suenaga, Hyogo, both of Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo and Teikoku Chemical Industry Co., Ltd., Osaka, both of, Japan

Filed Jun. 10, 1985, Ser. No. 743,095

Claims priority, application Japan, Jul. 3, 1984, 59-137491

Int. Cl.⁴ C09K *19/12, 19/20*; C07C *69/76, 69/78*

U.S. Cl. 560—64 **3 Claims**

1. A liquid crystal compound selected from the group consisting of 4″-octylphenyl 4′-(6-methyloctyloxy)benzoate, 4′-(6′-methyloctyloxy)phenyl 4-n-octylbenzoate, 4′-n-octylphenyl 4-(5-methylheptylcarboxy)-benzoate and 4″-(6″-methyloctyloxy) phenyl 4-n-heptylbiphenyl-4′-carboxylate.

4,710,586

FLUID LOSS ADDITIVES FOR OIL BASE MUDS AND LOW FLUID LOSS COMPOSITIONS

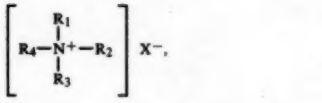
Arvind D. Patel, Houston, and Carmelita S. Salandanan, Sugarland, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 17, 1984, Ser. No. 661,639

Int. Cl.⁴ C07C *69/88*

U.S. Cl. 560—68 **10 Claims**

1. Quebracho ammonium salt reaction products of quebracho with an alkyl quaternary ammonium salt having the formula



wherein R_1, R_2, R_3 and R_4 are alkyl groups, at least one of which contains from 1 to 6 carbon atoms and at least one of which contains 10 to 22 carbon atoms, or aralkyl groups wherein the alkyls contain 1 to 3 carbon atoms; X is a halogen, sulfate or hydroxyl anion.

4,710,587

PROCESS FOR REMOVING TRIORGANOPHOSPHINE FROM AN ORGANIC LIQUID

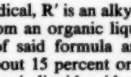
David R. Bryant, and Richard A. Galley, both of South Charleston, W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 140,740, Apr. 16, 1980, abandoned. This application Aug. 2, 1985, Ser. No. 762,028

Int. Cl.⁴ C07C *45/80*

U.S. Cl. 568—454 **8 Claims**

1. A process for selectively removing at least about 65 percent of alkyl substituted phosphine of the formula



wherein R is an alkyl radical, R′ is an alkyl or aryl radical and R″ is an aryl radical from an organic liquid containing alkyl substituted phosphine of said formula and triarylphosphine while removing only about 15 percent or less of said triarylphosphine from said organic liquid, said process consisting of the steps of

(1) mixing said organic liquid with an aqueous solution of about 40 to about 60 percent by weight phosphoric acid,

(2) allowing the mixture to settle into two distinct liquid phases, and

(3) separating the aqueous-acidic phase which contains the protonated reaction products of said phosphines with said phosphoric acid from the non-aqueous organic phase resulting from said steps (1) and (2); and

(4) washing said non-aqueous organic phase of step (3) with an aqueous alkaline solution and then with water;

wherein the volume ratio of said aqueous phosphoric acid solution employed to the volume of said organic liquid employed is at least about 0.1 to 1,

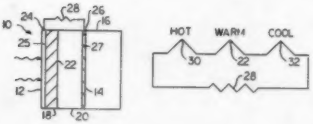
and wherein said organic liquid is a distillate of a rhodium complex catalyst containing hydroformylation medium or derivative of said distillate containing alkyl substituted phosphine of said formula and triarylphosphine, the remainder of said distillate consisting essentially of high boiling aldehyde condensation by-products.

4,710,588

COMBINED PHOTOVOLTAIC-THERMOELECTRIC SOLAR CELL AND SOLAR CELL ARRAY

M. Edmund Ellion, Arcadia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 6, 1986, Ser. No. 915,354
Int. Cl.[4] H02N 6/00; H01L 25/02, 35/00
U.S. Cl. 136—206 13 Claims



1. A solar cell array, comprising:

a plurality of electrically connected gallium arsenide solar cells;

means for imposing a thermal gradient across the thickness of each of said solar cells greater than that normally experienced by gallium arsenide solar cells exposed to direct sunlight, a hot face of said solar cells being at a temperature greater than a cool face thereof; and

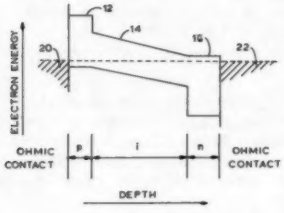
face electrode means in contact with said solar cells, including a hot junction electrode producing a high thermoelectric potential at said hot face and a cool junction electrode producing a low thermoelectric potential at said cool face of each of said solar cells.

4,710,589

HETEROJUNCTION P-I-N PHOTOVOLTAIC CELL

Peter V. Meyers, Green Lane, Pa.; Chung-Heng Liu, Princeton Junction, N.J., and Timothy J. Frey, Schwenksville, Pa., assignors to Ametek, Inc., Paoli, Pa.

Filed Oct. 21, 1986, Ser. No. 922,122
Int. Cl.[4] H01L 31/06
U.S. Cl. 136—258 PC 21 Claims



1. A heterojunction p-i-n photovoltaic cell having at least three layers of different semiconductor materials, composed together of at least four different elements, comprising:

a p-type, relatively wide band gap semiconductor layer;

a high resistivity intrinsic semiconductor layer, used as an absorber of light radiation;

an n-type, relatively wide band gap semiconductor layer; said intrinsic layer being in electrically conductive contact on one side with said p-type layer and on an opposite side with said n-type layer; and

first and second ohmic contacts in electrically conductive contact with said p-type layer and said n-type layer, respectively.

4,710,590

SEALING DEVICE IN METAL CABINETS, WHICH SCREENS OFF ELECTRO-MAGNETIC FIELDS

Per A. A. Ekdahl, Järfälla, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

PCT No. PCT/SE85/00219, § 371 Date Jan. 23, 1986, § 102(e) Date Jan. 23, 1986, PCT Pub. No. WO86/00491, PCT Pub. Date Jan. 16, 1986
PCT Filed May 24, 1985, Ser. No. 843,700
Claims priority, application Sweden, Jun. 18, 1984, 84032507
Int. Cl.[4] H05K 9/00
U.S. Cl. 174—35 GC 10 Claims

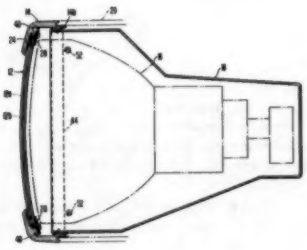
1. A sealing device for a metal cabinet for screening electromagnetic fields comprising first and second adjacent elements, one of said elements being a pivotable door which is pivotably movable around a pivot axis between open and closed positions relative to the other of said elements, a compressible metallic gasket, said door having an edge facing said other element which supports said gasket and which moves towards and away from said other element when the door travels between said open and closed positions, an elongate element disposed adjacent said edge of said door and substantially coextensive in length therewith, hinge means supporting said elongate element for pivotal movement about an axis parallel to the pivot axis of the door, said elongate element having first and second elongate contact surfaces so disposed that when the elongate element is pivoted in one direction about its hinge axis relative to said other element said first elongate contact surface applies pressure to compress said gasket with increased leverage effect while said second elongate contact surface applies counterpressure against said other element to prevent the door from warping due to the pressure applied on the gasket, said hinge means being located between said first and second elongate contact surfaces such that the hinge means is not substantially loaded when the elongate contact surfaces apply the pressure and counterpressure respectively.

4,710,591

EMI/RFI SHIELDING ASSEMBLY FOR CATHODE RAY TUBE MONITORS

Charles R. Rochester, Jr., Upper Darby, Pa., assignor to Unisys Corporation, Detroit, Mich.

Filed Oct. 6, 1986, Ser. No. 924,428
Int. Cl.[4] H05K 9/00
U.S. Cl. 174—35 GC 9 Claims



1. A shielding assembly for suppressing electromagnetic emissions from the face of a cathode ray tube mounted in a metallic chassis comprising:

a filter window positioned in proximity to the face of said

cathode ray tube, said filter window being comprised of a pair of contigous glass plates having metallic mesh interposed therebetween, said pair of glass plates including an inner plate situated closest to said face of said cathode ray tube and an outer plate, the corresponding dimensions of said outer plate being smaller than those of said inner plate, whereby a ledge is formed around the periphery of said window, said metallic mesh protruding from said plates as a sleeve along said ledge,

a resilient member disposed on said ledge and encircling said filter window, said sleeve being wrapped upon said resilient member,

a metallic bezel, clamping means disposed on said bezel for retaining said filter window therein, said resilient member being positioned adjacent the inner surface of said bezel, said clamping means including a movable member having an arcuate section at one extremity thereof, an adjacent planar section having a slot-like aperture therein for accommodating a screw, and a section orthogonal to said planar section at the opposite extremity thereof, said last mentioned section having a tail-like medial projection,

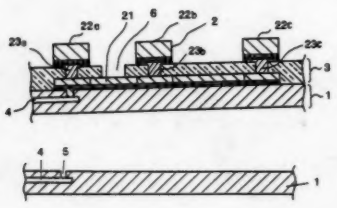
said bezel having a tapped hole for receiving said screw and an oversized locating hole to accommodate said projection, said locating hole having a depth greater than the length of said projection, whereby the portion of the orthogonal section adjacent said projection abuts the inner surface of said bezel as said screw is torqued, said arcuate section contacting the surface of said inner glass plate whereby a pressure is applied normal to the glass surface, thereby compressing said resilient member against said bezel and effecting a first electrical termination.

4,710,592

MULTILAYER WIRING SUBSTRATE WITH ENGINEERING CHANGE PADS

Kohji Kimbara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 18, 1986, Ser. No. 875,670
Claims priority, application Japan, Jun. 25, 1985, 60-138722
Int. Cl.[4] H05K *1/00*
U.S. Cl. 174—68.5 **11 Claims**



1. A multilayer wiring substrate comprising:

a wiring layer section including a plurality of wiring layers and insulating layers laminated alternatively;

a link structure made of electrically conductive material formed at a predetermined area on said wiring layer section and electrically connected to at least one of said wiring layers;

a further insulating layer formed on said link structure, and on some regions of said wiring layer section other than said predetermined area;

said further insulating layer having a plurality of via holes and a gap through which said link structure is exposed; and

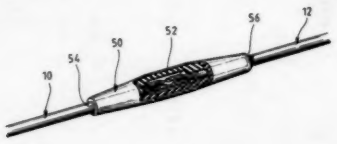
a plurality of pad portions respectively formed on said further insulating layer and contacting said link structure through a corresponding via hole.

4,710,593

GEOPHONE CABLE SPLICE AND METHOD

Ernest M. Hall, Jr., Houston, and Jeffrey A. Buis, Sugar Land, both of Tex., assignors to Oyo Corporation, Houston, Tex.

Filed Jul. 14, 1986, Ser. No. 885,558
Int. Cl.[4] H02G *15/18*
U.S. Cl. 174—88 R **11 Claims**



1. A geophone cable splice comprising,

a printed circuit board having at least two spaced apart electrical conductive lands bonded to an electrical nonconductive base,

first and second round cables, each of said cables having at least first and second round electrical conductors said first conductors of each of said cables soldered to one of the electrical lands and said second conductors of each of said cables soldered to another electrical land, and

a resilient boot having an opening therethrough, said opening enclosing the printed circuit board with one end of the boot sealingly engaging the first cable and the other end of the boot sealingly engaging the second cable.

7. The method of splicing two round geophone cables together, each of which have an outer round jacket, and at least first and second insulation-covered round electrical conductors comprising,

stripping the outer jackets of the ends of the cables to be spliced.

stripping the insulated covers from the ends of the electrical conductors;

soldering the first stripped conductors to a conductive land which is bonded to an electrically nonconductive base of a printed circuit board,

soldering the second stripped conductors to a second conductive land which is bonded to be base of the printed circuit board, and

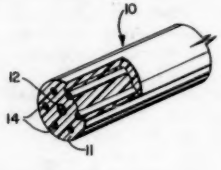
sliding a resilient boot having an opening therethrough over the cables and the printed circuit board with a lubricant located between the boot and the cables in which the ends of the opening have a normal size of less than the outside circumference of the cables.

4,710,594

TELECOMMUNICATIONS CABLE

Jorg-Hein Walling, Beaconsfield; Jacques Cornibert, Ile Des Seours; Gordon D. Baxter, Kingston; Marie-Francoise Bottin, Lachine; Oleg Axiuk, Pincourt, and Phillip J. Reed, Dorval, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jun. 23, 1986, Ser. No. 877,065
Int. Cl.[4] H01B *7/00*
U.S. Cl. 174—120 SR **16 Claims**



1. A telecommunications cable devoid of a metal sheath and comprising a core including a plurality of individually insu-

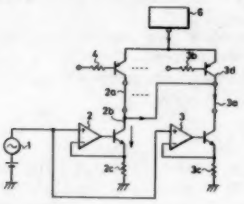
lated conductors, a surrounding jacket and a plurality of substantially equally pre-tensioned and substantially inextensible elongate tensile members embedded in the jacket and extending longitudinally of the cable to place an axially compressive force upon the jacket, the elongate members spaced apart circumferentially around the core.

4,710,595

COORDINATE INPUT DEVICE

Kiyoshi Kimura, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Dec. 12, 1986, Ser. No. 941,160
Claims priority, application Japan, Jan. 25, 1986, 61-8397[U]
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—18 **4 Claims**



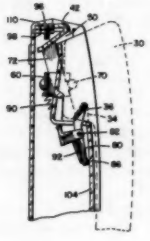
1. A coordinate input device comprising
main loops made of conductors embedded parallelly in an input plane,
a compensating loop disposed in the vicinity of the common wire of said main loops,
switching elements for successively sending out a scanning signal to said individual main loops,
a switching element for sending out a current to said compensating loop,
a current drive circuit pertinent to said main loops, and
a current drive circuit pertinent to said compensating loop,
wherein a position is obtained on the basis of signals detected by a coordinate designating means capable of pointing out any spot on said input plane,
characterized in that the output side of said main loops is connected with the input side of said compensating loop.

4,710,596

TELEPHONE UNIT ADAPTED FOR VERTICAL AND HORIZONTAL MOUNTING

Haruo Kurokawa, Liverpool, N.Y., assignor to General Electric Company, Bridgeport, Conn.

Filed Dec. 31, 1984, Ser. No. 687,587
Int. Cl.[4] H04M *1/02, 1/04, 1/08, 11/00*
U.S. Cl. 379—424 **7 Claims**



1. A telephone unit adapted for mounting in vertical and horizontal modes, said telephone unit comprising:
a handset having a predetermined configuration,
a cradle including stationary wall means at least partially forming a complementary configuration for receiving and supporting said handset in a fixed position relative thereto,
the predetermined configuration of said handset including a downwardly facing recess therein when the telephone unit is mounted in its vertical mode,
a hook member movable between a first position in which a portion of said hook member projects from said stationary wall means into a space occupied by said handset recess when said handset is received in said fixed position relative to said cradle and a second position in which no portion of said hook member projects into the space occupied by said handset recess when said handset is received in said fixed position relative to said cradle,
a movable wall means movable between a first position spaced substantially from the space occupied by said handset when said handset is received in said fixed position relative to said cradle and a second position adjacent the space occupied by said handset when said handset is received in said fixed position relative to said cradle,
means coupling said hook member and said movable wall means such that said hook member and said movable wall means may be selectively moved by a user in unison in either direction between their respective first positions and their respective second positions,
and locking means for selectively locking said hook member and said movable wall means in either of their respective first and second positions,
the said handset recess and said hook member having an orientation in its first position such that when the telephone unit is mounted in its vertical mode and said handset is placed on said cradle the weight of said handset causes said handset to move downwardly with said hook member received in said handset recess to said fixed position of said handset relative to said cradle, and an orientation of said handset and said movable wall means in its second position being such that when the telephone unit is mounted in its horizontal mode and said handset is placed on said cradle the weight of said handset causes said handset to move downwardly in engagement with said movable wall means to said fixed position of said handset relative to said cradle,
whereby a user may move said hook member and said movable wall means to their respective first positions whe mounting of the telephone in its vertical mode is desired and said hook member and said movable wall means to their respective second positions when mounting of the telephone in its horizontal mode is desired.

4,710,597

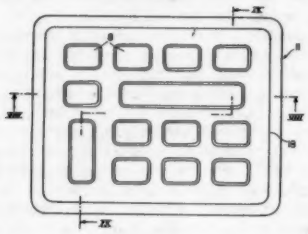
KEYBOARD FOR THE CONTROL BOX OF AN ELECTRIC APPARATUS

Charles Loheac, Auray, France, assignor to Tabur Caoutchouc, Vannes, France

PCT No. PCT/FR85/00173, § 371 Date Feb. 13, 1986, § 102(e) Date Feb. 13, 1986, PCT Pub. No. WO86/00462, PCT Pub. Date Jan. 16, 1986
PCT Filed Jun. 25, 1985, Ser. No. 845,140
Claims priority, application France, Jun. 26, 1984, 84 10056
Int. Cl.[4] H01H *13/70*
U.S. Cl. 200—5 A **18 Claims**

1. A keyboard for a control box of an electrical apparatus comprising:
(a) a first sheet comprising:
(i) a plurality of contactors, wherein each of said contactors comprises an elastically deformable blister projecting from said first sheet to function as a spring; and
(ii) a plurality of contact pads positioned within said blisters; and
(b) a second sheet comprising a plurality of keys, each having a housing therein, wherein said plurality of contact pads comprise means for contacting a printed circuit in response to a pressure applied on said plurality of keys,
wherein at least one of said plurality of contactors comprises

a stub positioned atop of said contactor opposite from said contact pads, and



wherein said at least one stub comprises means for being force fitted into said housing of one of said plurality of keys.

4,710,598

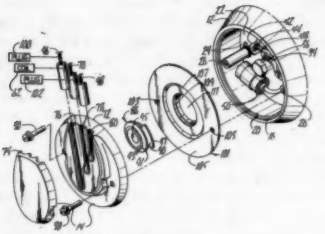
DISTRIBUTOR FOR MULTI-CYLINDER ENGINE

Mac P. McAbee, 3136 Cottage Grove, Des Moines, Iowa 50311, and Deloss J. Biddle, Urbandale, Iowa, assignors to Mac Patrick McAbee, Des Moines, Iowa

Continuation-in-part of Ser. No. 826,989, Feb. 7, 1986, Pat. No. 4,658,103. This application Dec. 22, 1986, Ser. No. 945,035

Int. Cl.[4] H01H *19/04*

U.S. Cl. 200—21 9 Claims



1. An improvement in a distributor for a two cylinder engine having first and second sparkplugs, said distributor comprising a housing forming a compartment having an open upper end and containing therein a rotor, a stationary contact point, a movable contact point, and spring means normally holding said movable contact point in a closed position in contact with said stationary contact point, said movable contact point being yieldably movable to an open position in spaced relation to said stationary contact point, said rotor having two lobes adapted for rotation to engage said movable contact point and cause said movable contact point to move to its open position twice during each revolution of said rotor, an electrical power circuit connected to said contact points and including an outlet connection, said power circuit being adapted to cause a surge of electrical current to be introduced to said outlet connection each time said movable contact point is moved to its open position, a single discharge coil having an inlet terminal connected to said outlet connection of said power circuit, said discharge coil having a single discharge post, said improvement comprising:

a dielectric gasket positioned in covering relation within said compartment over said stationary contact point and said movable contact point, said gasket having a central opening therein;

a dielectric circular disk above said gasket and having a lower portion extending through said central opening of said gasket and being detachably connected to said rotor for rotation in unison therewith, said disk having a conductive sheet attached thereto positioned above said gasket whereby said gasket provides a physical barrier between said conductive sheet above said gasket and said movable and stationary contacts below said gasket;

coil connection means connecting said discharge post of said coil to said conductive sheet for electrical connection thereto at all times throughout said rotation of said conductive sheet in unison with said rotor;

a first plug contact positioned to electrically engage said conductive sheet during a first portion of each revolution of said disk,

second plug contact positioned to electrically engage said conductive sheet during a second portion of each revolution of said disk,

means for connecting said first sparkplug to said first plug contact and said second sparkplug to said second plug contact,

said first and second plug contacts being positioned to be in contact with said conductive sheet at separate times and not simultaneously during any portion of each revolution of said disk.

4,710,599

SWITCH ATTACHMENT STRUCTURE FOR USE ON MOTOR VEHICLES WITH HANDLEBARS

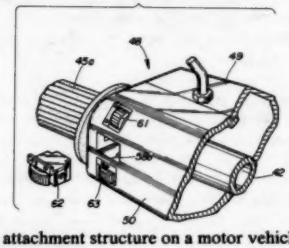
Shoji Motodate; Yuichi Morino, and Norihiro Kurata, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 7, 1986, Ser. No. 849,000

Claims priority, application Japan, Apr. 30, 1985, 60-92532

Int. Cl.[4] H01H *9/06*

U.S. Cl. 200—61.85 21 Claims



1. A switch attachment structure on a motor vehicle having a handlebar, comprising:

a handle cover fixed to the handlebar and at least partly covering said handlebar;

a plurality of switches mounted on said handle cover for controlling electric components on the motor vehicle;

said handle cover having a plurality of switch receivers to which said switches are fittingly attached, respectively;

said switch receivers comprising recesses formed in said handle cover, said recesses being shaped complementarily to switch bodies of said switches; and

said switches being insertably mounted into said handle cover recesses from outside of said handle cover.

4,710,600

DETENT MECHANISM FOR SLIDING ELECTRIC PARTS

Shinji Sasaki, Miyagi; Yujiro Shimoyama, and Yoshinori Watanabe, both of Furukawa, all of Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Sep. 23, 1985, Ser. No. 779,151

Claims priority, application Japan, Sep. 21, 1984, 59-143134[U]

Int. Cl.[4] H01H *15/10*

U.S. Cl. 200—291 1 Claim

1. In a sliding electric switch of the type having a casing with an elongated linear slit formed horizontally in a front wall of the casing and an operation lever disposed in the casing so

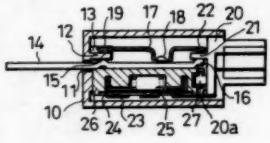
as to move linearly along the slit, the lever having a portion extending outside the casing for operation by the user,

the improvement comprising:

means in said casing and including a portion of said operation lever disposed in said casing for constraining said lever for movement in parallel with said slit;

a slide guide formed integrally with said front wall of said casing on an upper side of said slit having a corrugated surface with a series of cam crests on an upper face of said slide guide extending parallel to said slit;

an engaging member fixed to said operation lever and having an end disposed on said corrugated surface to engage said cam crests in a series of corresponding detent positions as said operation lever is moved along said slit; and



means for biasing at least one of said slide guide and said end of said engaging member in pressing engagement with each other despite their relative movement across said cam crests and without any looseness, said biasing means being constituted by said engaging member being a leaf spring fixed to an upper side of said operation lever at an intermediate position thereof with a downward protrusion formed at its end in engagement with said cam crests, and by an upward protrusion formed on the upper side of said operation lever slidably in contact with a lower face of said slide guide for elastically clamping said downward protrusion of said leaf spring to said corrugated surface of said slide guide.

4,710,601

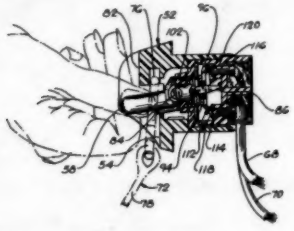
SEALED TOGGLE ACTION ELECTRICAL SWITCHES

Andrew F. Raab, Morton Grove, and John W. Habecker, Zion, both of Ill., assignors to Indak Manufacturing Corp., Northbrook, Ill.

Division of Ser. No. 803,491, Dec. 2, 1985. This application Mar. 18, 1987, Ser. No. 27,528

Int. Cl.[4] H01H *19/06*

U.S. Cl. 200—302.3 **6 Claims**



1. A toggle action electrical switch, comprising

a casing,

an electrical insulating operating lever swingable in the casing,

the lever having an outer arm projecting out of the casing and an inner arm projecting into the casing,

an electrically conductive electrical contactor slidable along the inner arm and swingable relative to the inner arm,

first and second fixed electrical contacts mounted in the casing and slidably engageable by the contactor,

such contactor being movable with the lever between a first position in which the contactor bridges electrically between the contacts and a second position in which the contactor does not bridge electrically between the contacts,

a coil spring mounted around the inner arm and interposed between the lever and the contactor for biasing the contactor toward the contacts,

the lever having first and second positions corresponding to the first and second positions of the contactor,

the spring producing a toggle action for resiliently resisting movement of the lever between its first and second positions while resiliently biasing the lever alternately into its first and second positions,

and a flexible resilient sealing boot interposed between the operating lever and the casing,

the boot having a sealing flange interposed between the coil spring and the lever whereby the sealing flange is compressed into sealing engagement with the lever by the spring.

4,710,602

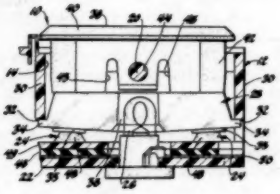
ILLUMINATED ROCKER SWITCH ASSEMBLY

Donald N. Baity; Gregory J. Schwandt, both of Kokomo, and Charles E. Kidwell, Greentown, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 3, 1986, Ser. No. 825,151

Int. Cl.[4] H01H *9/00*

U.S. Cl. 200—315 **6 Claims**



1. A manually operated switch assembly for selectively actuating a pair of switches, comprising;

a housing defining an aperture, a circuit board mounted in said housing opposite the aperture,

a pair of resilient push-button switches mounted on the circuit board, each switch defining a switch contact point thereon,

a rocker pivotally mounted in the aperture of the housing for movement about a fixed axis at the center of the aperture, and

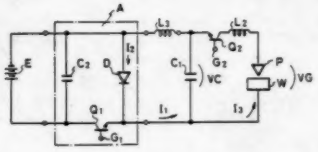
an actuator between the rocker and the switches, each end of the actuator continuously engaging one of said switches at said switch contact points and further engaging the housing at points in substantial alignment with the switch contact points to define pivot axes for the respective opposite ends of the actuator, whereby upon rocker movement against one end of said actuator, said actuator rotates about the pivot axis at the other end of said actuator, said switches being such that lateral movement of the actuator at the switch contact point is minimized.

4,710,603

ELECTRIC DISCHARGE MACHINING POWER SOURCE

Haruki Obara, Sagamihara, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP85/00060, § 371 Date Oct. 28, 1985, § 102(e) Date Oct. 28, 1985, PCT Pub. No. WO85/03894, PCT Pub. Date Sep. 12, 1985
PCT Filed Feb. 14, 1985, Ser. No. 801,157
Claims priority, application Japan, Feb. 29, 1984, 59-35984
Int. Cl.[4] B23H *1/02*; G05F *1/44*
U.S. Cl. 219—69 C 8 Claims



1. An electric discharge machining power source for a capacitor discharge circuit of an electric discharge machine, having an electrode, for machining a workpiece, said electric discharge machining power source having a stray inductance therein, and supplying machining pulses across a machining gap between the electrode and the workpiece, comprising:

a charging switching element arranged to be turned on and off, said charging switching element being turned on for a period of time which is adjustable beforehand;

a discharging switching element arranged to be turned on and off, said charging and discharging switching elements being turned on alternately;

a charging/discharging capacitor coupled to said charging switching element and said discharging switching element, said charging/discharging capacitor being coupled through said discharging switching element to said machining gap and in series therewith, said charging/discharging capacitor being charged to a predetermined level during the period of time for which said charging switching element is turned on;

a diode coupled to said charging/discharging capacitor and said charging switching element at a node, the stray inductance having energy stored therein which causes an electric current to flow through said diode when said charging switching element is turned off, so that said charging-/discharging capacitor is charged; and

a power source smoothing capacitor coupled to said diode and said charging switching element, said diode, said charging switching element and said power source smoothing capacitor being arranged on a printed circuit board, without a charging current limiting resistor, so that the stray inductance has a value which is sufficient to prevent said charging switching element from being damaged even when the energy stored in the stray inductance is applied to said charging switching element, and to enable high-speed charging of said charging/discharging capacitor

---

4,710,604

MACHINING APPARATUS WITH LASER BEAM

Hiroshi Shirasu; Kazuhiro Shimeno, both of Yokohama, and Joji Iwamoto, Kawasaki, all of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Dec. 17, 1986, Ser. No. 942,730
Claims priority, application Japan, Dec. 20, 1985, 60-287240; Jun. 19, 1986, 61-144341
Int. Cl.[4] B23K *26/02, 26/08*
U.S. Cl. 219—121 LU 14 Claims

1. A machining apparatus with a laser beam, comprising:

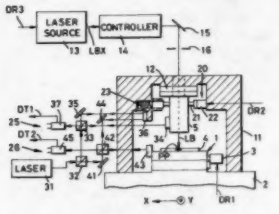
an energy beam source for generating an energy beam;

a movable stage assembly on which a workpiece is placed;

an optical system for directing the energy beam toward the workpiece and forming a machining beam spot thereon;

means for setting a target machining position on the workpiece;

means for detecting a relative distance between the machining beam spot and the target machining position; and



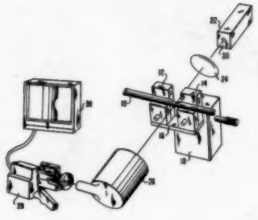
means for driving said movable stage assembly and said optical system in response to detection outputs from said detecting means, said stage assembly being moved to cause the workpiece to come close to the machining beam spot when the relative distance detected by said detecting means exceeds a predetermined distance, and said machining beam spot being moved to come close to the workpiece when the relative distance is shorter than the predetermined distance.

4,710,605

LASER NIBBLING OF OPTICAL WAVEGUIDES

Herman M. Presby, Highland Park, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 8, 1985, Ser. No. 721,165
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 LJ 6 Claims



1. A method of micromachining an optical waveguide comprising the steps of:

establishing a focussed laser beam in a machining region;

gradually moving a circumferential edge of said optical waveguide into the machining region such that at least an edge of said laser beam impinges on said circumferential edge of said optical waveguide; and

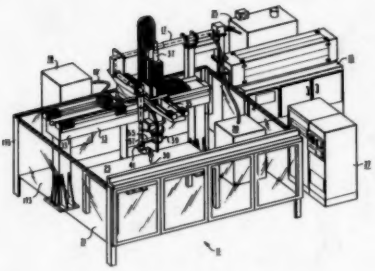
pulsing said laser beam at a predetermined rate and for a predetermined pulse duration which results in the flash ablation of small portions of material along said circumferential edge of said optical waveguide upon which the laser beam impinges such that no significant redeposition of flash ablated material occurs on the optical waveguide and the geometry of the remaining optical waveguide is substantially undisturbed.

4,710,606

TWO-AXIS OPTIC WRIST FOR LASER APPLICATIONS

Daniel P. Soroka, Imperial; Roger L. Swensrud, Plum Borough, and Joseph J. Zelezniak, Upper St. Clair Twp., Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 28, 1986, Ser. No. 867,859
Int. Cl.[4] B23K *26/08*
U.S. Cl. 219—121 LU 2 Claims



1. A two-axis optical wrist comprising:

(A) a mounting bracket having an aperture therethrough including means for removably securing said mounting bracket to the terminal end of a laser beam delivery system and through which aperture the beam passes;

(B) a first and a second mirror housing, each mirror housing having a first mounting face with an aperture therethrough and a second mounting face with an aperture therethrough perpendicular to said first mounting face, and defining therein a chamber in open communication through said first and second mounting face apertures and a reflective surface disposed within said chamber;

(C) a first and a second motor means each having an inner stator, an outer stator and an annular rotor which is coaxially positioned between the inner and outer stators about an axis of revolution, which axis of revolution is coincident with the beam being conveyed therethrough;

(a) said first motor means defining a conduit through which the beam passes the inner and outer stator means being in a mechanically fixed association with said mounting bracket and the rotor means being in a mechanically fixed relationship with said first mirror housing first mounting face,

(b) said second motor means defining a conduit through which the beam passes, the inner and outer stator being in a mechanically fixed association with said first mirror housing second face and the rotor being in a fixed mechanical association with the second mirror housing first mounting face;

(D) a laser beam focussing assembly removably mounted on the second mirror housing second face;

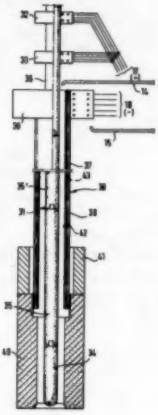
wherein rotation of either motor means about its axis of motion causes the beam reflected by the reflective surface of the mirror housing associated with the rotor thereof passes at an angle of 90° to the originating beam and describes a generally flat surface to which the axis of rotation of the motor means is perpendicular.

4,710,607

PLASMA BURNER WITH REPLACEABLE CONSUMABLE ELECTRODES

Herbert Wilhelmi, Aachen-Richterich; Kurt Kegel, Essen; Dieter Zollner, Schwaig/b. Nürnberg; Inge Lauterbach-Dammler, Nürnberg; Thomas Taube, Neunkirchen am Brand, and Friedrich Rittman, Rückersdorf/b. Nürnberg, all of Fed. Rep. of Germany, assignors to C. Conradty Nurnberg GmbH & Co., Pegnitz, Fed. Rep. of Germany

Filed May 6, 1986, Ser. No. 860,091
Claims priority, application European Pat. Off., May 22, 1985, 85106247.1
Int. Cl.[4] B23K *9/00*
U.S. Cl. 219—121 P 28 Claims



1. A plasma burner having a tubular outer electrode, a central electrode located coaxially within said outer electrode thereby forming an annular space between said electrodes, an electrical current supply, means for coupling the current supply to the outer electrode and to the central electrode and means for feeding gas into the annular space, whereby an arc for plasma formation is produced between the electrodes,

characterized in that the tubular outer electrodes is comprised of a first cooled, arc-inactive electrically-conductive tube section and a second uncooled arc-active consumable tube section which second tube section is releasably coupled to the first tube section and

further characterized in that the central electrode is comprised of a third arc-inactive electrically-conductive section and a fourth arc-active consumable section which third electrode section is releasably coupled to the fourth electrode section.

4,710,608

FIXTURE FOR WELDING LONG WORKPIECES

Naoki Noda, Toyota; Iwao Nihashi, Okazaki, and Kazuhiro Sato, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Apr. 9, 1987, Ser. No. 36,569
Claims priority, application Japan, Apr. 9, 1986, 61-81578
Int. Cl.[4] B23K *9/32*
U.S. Cl. 219—161 16 Claims

1. A welding fixture for holding a plurality of long component members that are welded along their length into an elongate product, comprising:

at least three stationary clamps disposed in spaced-apart relation with each other in a longitudinal direction of said long component members;

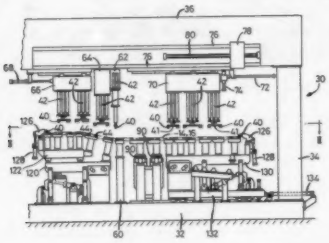
at least three movable clamps disposed opposite to said at least three stationary clamps, respectively, and cooperating with said at least three stationary clamps members to

clamp said component members in opposite clamping directions toward each other substantially perpendicular to said longitudinal direction of the component members;

a pivot base supporting at least one of said at least three stationary clamps;

a supporting device for supporting said pivot base pivotally in a plane parallel to said clamping directions, about a pivot axis which is located on said component members clamped by said movable and stationary clamps; and

a pivoting actuator operable for pivoting said pivot base prior to welding of said component members along the lengths thereof, and thereby bending said component members, so as to compensate for welding strains of the component members.



4,710,609

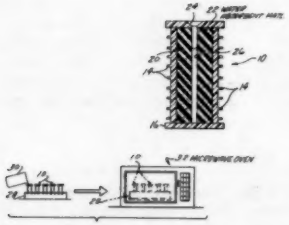
PROCESS FOR HEATING HAIR CURLERS BY MICROWAVE ENERGY

Michael Switlicki, 3330 Rabidue Rd., Goodells, Mich. 48027

Filed Mar. 27, 1986, Ser. No. 844,965

Int. Cl.[4] A45D *2/00*; **H05B** *1/00, 6/64*

U.S. Cl. 219—222 **2 Claims**



1. A process of heating hair curlers constructed of a material through which microwaves may pass comprising the steps of:

positioning a mass of wicking material within a cavity in a hair curler constructed of a material transparent to microwave energy and configured to be impermeable to water vapor along the sides thereof, said wicking material being constructed of a material which allows the passage of microwave energy therethrough;

dispersing a quantity of water into said mass of wicking material contained in said cavity;

subjecting said hair curler with said dispersed quantity of water to microwave radiation to heat said quantity of water and thereby heat said hair curler.

4,710,610

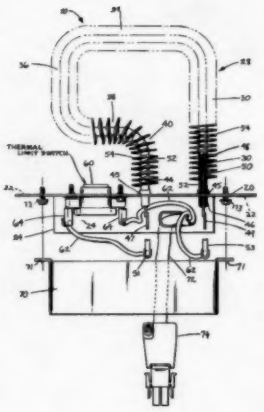
ELECTRIC RESISTANCE HEATER AND LIMIT SWITCH ASSEMBLY

Allan J. Reifel, Florissant, and James E. Roth, DeSoto, both of Mo., assignors to Nordyne, Inc., St. Louis, Mo.

Filed Sep. 8, 1986, Ser. No. 904,414

Int. Cl.[4] H05B *1/02*; **F24H** *3/00*; **H01H** *37/00*

U.S. Cl. 219—363 **5 Claims**



1. A heater and limit switch assembly adapted for installation within an air duct, comprising

a mounting plate,

a rigid planar modified-loop electrical resistance heater comprising

a first elongated end leg portion mounted at one end onto and substantially perpendicular to said mounting plate and terminating at its other end at the first end of an elongated second portion,

said second portion extending substantially perpendicular to said first end leg portion,

an elongated initial return portion extending from the other end of said second portion, substantially parallel to and spaced from said first end leg portion, and, continuing therefrom,

an inward offset portion extending toward said first end leg portion and substantially parallel to and spaced from said mounting plate, the length of said offset portion being substantially less than said second portion, and terminating in

a second end leg portion spaced from and substantially parallel to said first end leg portion and mounted onto and substantially perpendicular to said mounting plate, in combination with

a temperature responsive limit switch mounted on said plate outwardly of said second end leg portion and inwardly of said initial return portion and facing said inward offset portion,

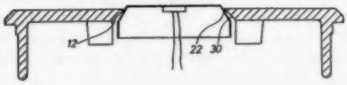
whereby said modified loop configuraiton, and particularly the inward offset and second leg portions thereof, together with the mounted position of said limit switch relative thereto, afford improved response to temperature rise of the loop.

4,710,611

ARRANGEMENT IN A COOKING PLATE OR HOB HAVING A TEMPERATURE SENSOR

Claes J. H. Axelson, Stockholm, Sweden, assignor to AB Electrolux, Sweden

Filed Jun. 26, 1986, Ser. No. 878,589
Claims priority, application Sweden, Jul. 12, 1985, 8503462
Int. Cl.[4] H05B 3/70
U.S. Cl. 219—450 4 Claims



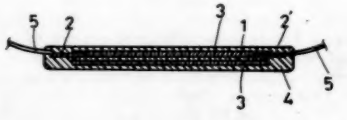
1. In an arrangement in a cooking plate or hob having a temperature sensor, the cooking plate or hob being provided with a central through hole in which a body supporting the temperature sensor is movably arranged, the body being urged by spring means in a direction towards the upper side of the cooking plate or hob, the movement being limited by a shoulder in the boundary surface of the hole, the shoulder cooperating with a surface on the body, said surface having a shape that corresponds with the adjacent envelope surface of said movable body, wherein the improvement comprises said shoulder connecting with the upper side of the cooking plate and the body being constituted of a cup-shaped thin plate which opens downwards and has a planar upper side and an annular skirt which is adapted to be seated in the through hole and wherein the surface which cooperates with the shoulder connects the upper side of the plate with its skirt, and wherein said movable body is a right cone and said shoulder has a conical shape adapted to the cone wherein the cone angle of said shoulder is greater than that of said movable body.

4,710,612

STRUCTURE OF ELECTRIC HEATER

Jong-Tsuen Lin, No. 33, Sec. 4, Chung Hsing Rd., Wu Ku Hsiang, Taipei Hsien, and Chien-Han Ho, No. 8, Alley 12, Lane 91, Sec. 1, Nei Hu Rood, Taipei, both of Taiwan

Filed Oct. 15, 1986, Ser. No. 919,142
Int. Cl.[4] H05B 3/34, 3/54
U.S. Cl. 219—547 1 Claim



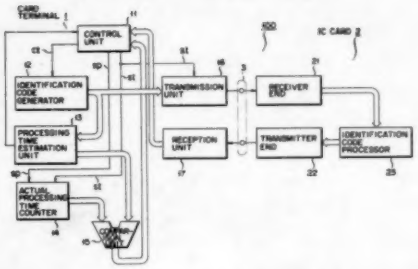
1. An electric heater comprising:
a bendable, strip conductor of a material selected from the group consisting of plastic or rubber and having an electric conductive and heat resistant chemical additive dispersed therethrough;
first and second electrical conductive means attached, respectively, to opposite sides of said strip conductor and adapter to be coupled to a source of electrical energy so that current will flow through said first means and through said strip to said second means to complete a circuit and thereby cause said strips to be heated;
a polyethylene layer adhering to and covering said strip; and
a PVC layer covering said polyethylene layer whereby heat generated in said strip will be emitted through said layers.

4,710,613

IDENTIFICATION SYSTEM

Yoshimi Shigenaga, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Dec. 4, 1985, Ser. No. 805,187
Claims priority, application Japan, Dec. 13, 1984, 59-263331
Int. Cl.[4] G06K 5/00
U.S. Cl. 235—380 14 Claims



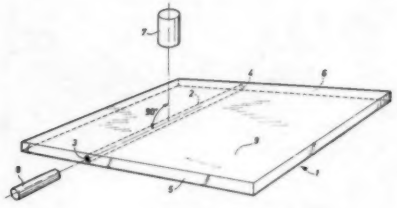
1. An identification system wherein validity between a first unit and a second unit is identified when the first unit is electrically communicated with the second unit,
said first unit including:
means for generating identification code information;
means for calculating, based upon the identification code information, an estimation time required for processing the identification code information in the second unit;
means for measuring an actual time required for completely processing the identification code information in the second unit, and
means for identifying validity between said first and second units by comparing the actual processing time to the estimation processing time; and
said second unit including:
means for processing the identification code information sent from said first unit.

4,710,614

SECURITY DOCUMENT USING OPTICAL FIBERS AND AUTHENTICATION METHOD

Michel Camus, Charavines, France, assignor to Arjomari-Prioux, Paris, France

Filed Jun. 18, 1986, Ser. No. 875,622
Claims priority, application France, Jun. 24, 1985, 85 09586
Int. Cl.[4] G06K 5/00
U.S. Cl. 235—380 10 Claims



1. A security document comprising a substrate containing at least one optical fiber of which at least one end is flush with a surface of the substrate so as to permit authentication of the document by exposing the document to a source of electromagnetic radiation and simultaneously observing the radiation transmitted to either end of the optical fiber and wherein the optical fiber has a transparent coating and is located within the

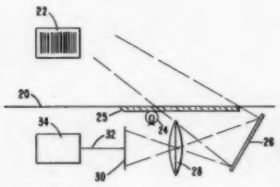
substrate at a depth from at least one surface of the substrate which is not greater than the depth of penetration of the electromagnetic radiation into the substrate.

4,710,615

CCD BAR CODE SCANNER

Thomas J. Meyers, St. Clairsville, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Jun. 26, 1986, Ser. No. 878,748
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—454 **11 Claims**



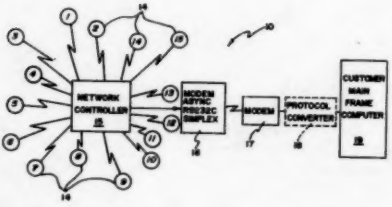
1. A system for scanning coded indicia comprising;
means for providing a plurality of light beams for illuminating a coded indicia;
rotating support means mounted in the path of the light beams reflected from the coded indicia;
light receiving means mounted on said rotating support means for storing electrical signals in response to receiving the reflected light beams;
circuit means mounted on said rotating support means and coupled to said light receiving means for reading and converting said electrical signals to binary data signals;
processing means for processing said binary data signals to establish the data represented by the coded indicia scanned; and
means coupled to said processing means and mounted adjacent said rotating support means for transferring the binary data signals stored by said light receiving means and converted by said circuit means, to said processing means.

4,710,616

MULTI-STATION DATA COLLECTION SYSTEM

David L. Utley, Salt Lake City, Utah, assignor to National Transdata Systems, Inc., Murray, Utah

Filed Jun. 2, 1986, Ser. No. 869,234
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—472 **8 Claims**



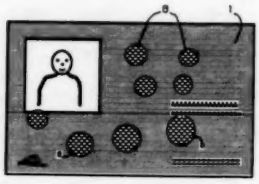
1. A data collection system for a shop area having multiple work stations comprising, a production work order generated for each work station having job identification data, steps, and delays programmed thereon in English and corresponding bar code groupings for each work item to be produced at said work station; a portable data entry terminal means that includes optical scanning means and a self contained power supply and can store optical pulses sensed by said scanning means as digital pulses in a memory portion thereof, which portable data entry terminal means is maintained at each work station by an operator/supervisor who moves said optical scanning means over selected bar code groupings for collecting job status information; means for retrieving and transmitting data collected by said data entry terminal for transmittal to a network controller means; a network controller means for the shop area arranged to receive said data transmitted from each said data entry terminal, receiving that data sequentially or simultaneously at entry ports and provides for multiplexing said data into a collection register that store that entered data as discrete signals in a holding register for later transmittal through an output port; mode means connected for receiving said network controller means data output and transmitting it to a main frame computer means; and a main frame computer means connected to receive said data output from said modem to process and handle that information to control operations in said shop area.

4,710,617

METHOD OF PROTECTING SECURITY DOCUMENTS

Daniel G. E. Mouchotte, Golfe Juan, France, assignor to Cimsa Sintra (S.A.), France

Filed May 23, 1986, Ser. No. 866,370
Int. Cl.[4] G06K *19/00*
U.S. Cl. 235—487 **4 Claims**



1. A method of protecting security documents of the type comprising uniting a substrate bearing information which is to be protected from tampering, together with transparent protective layers of thermoplastic material heat sealed around said substrate, the method including providing a set of pigment-retaining micro-holes in the substrate, said pigment being soluble in protective layer solvents.

4,710,618

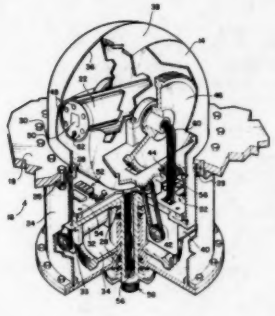
AIRBORNE TRACKING SUNPHOTOMETER APPARATUS AND SYSTEM

Yutaka Matsumoto, San Jose; Cesar Mina, Santa Clara; Philip B. Russell, Los Altos, and William B. van Ark, Sunnyvale, all of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 29, 1986, Ser. No. 823,712
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—203 R **15 Claims**

1. An airborne tracking sunphotometer system, which comprises an aircraft having an interior and a bulkhead, a rotatable dome extending from the interior through the bulkhead, a first drive means connected to rotate said rotatable dome, said rotatable dome having an equatorial slot above said bulkhead, a cylindrical housing pivotally mounted inside said dome with a portion of the outer surface of said cylindrical housing substantially filling said equatorial slot, a photometer mounted in said cylindrical housing to move in the equatorial slot as said cylindrical housing pivots, said photometer having an end facing outward from the slot, an optical flat transparent window mounted over the outward facing end of said photometer, said cylindrical housing being coupled to said rotatable dome

whereby the cylindrical housing and photometer are rotated when the dome is rotated, and a second drive means connected



to pivot said cylindrical housing to move said photometer in the slot of said rotatable dome.

4,710,619

APPARATUS FOR GENERATING A SIGNAL PROVIDING INFORMATION REGARDING A RADIATING SOURCE, ESPECIALLY AN INFRARED SOURCE

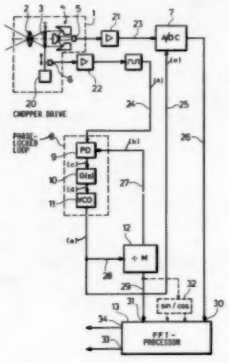
Fritz Haberl, Munich, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Dec. 20, 1985, Ser. No. 811,667

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3447721

Int. Cl.[4] G05D *1/08*

U.S. Cl. 250—203 R **9 Claims**



1. An apparatus for generating a deviation signal and a presence signal, wherein said deviation signal represents a deviation of an optical axis of an optical means from a line connecting said optical means with the center of a distant radiation source which is imaged by said optical means onto its image plane, and wherein said presence signal represents an information whether said radiation source is located at all within a range of vision of said optical means, said apparatus comprising an oscillating chopper disk being located in said image plane of said optical means and having a diameter equal to that of the image of said radiation source and sensor means for receiving all the radiation components passing periodically past the edges of said oscillating chopper disk and for producing therefrom a periodic analog sensor signal, drive means for driving said chopper disk, pick-up means arranged for producing a periodic analog chopper signal, an analog-to-digital converter connected to receive said analog sensor signal for converting said analog sensor signal into a digitized sensor signal, a phase-locked-loop circuit including a phase detector having a first input for receiving said periodic analog chopper signal for providing a phase control signal, control amplifier means connected to an output of said phase detector for integrating said phase control signal, an oscillator connected to said control amplifier means for producing start impulses, means connecting said oscillator to a start input of said analog-to-digital converter for repeatedly starting a sampling and digitizing of said analog sensor signal, mode-M counter means having an input connected to said oscillator and an output connected to a second input of said phase detector thereby providing a closed loop phase control circuit, said mode-M counter means counting up to a preselected number M and, upon reaching the count of M, providing phase reference carry signals to said second input of said phase detector, fast Fourier transformation processing means having a first input connected to said analog-to-digital converter for receiving said digitized sensor signal, and means connecting a second input of said fast Fourier transformation processing means to said mode-M counter means for receiving counted values having the same frequency or rhythm as said start impulses and being continuously numbered between two neighboring phase reference carry signals, whereby said fast Fourier transformation processing means produce said deviation signal and said presence signal.

4,710,620

SENSING APPARATUS FOR DETERMINING THE RELATIVE POSITION BETWEEN TWO BODIES WITH PLURAL EMITTERS AND A SHADING MEMBER

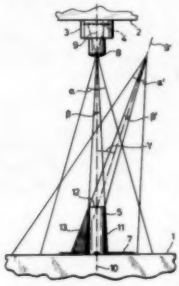
Bernd Kunkel, Kirchheim, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Fed. Rep. of Germany

Filed Aug. 22, 1985, Ser. No. 768,409

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1984, 3431616

Int. Cl.[4] G01J *1/20*

U.S. Cl. 250—203 R **6 Claims**

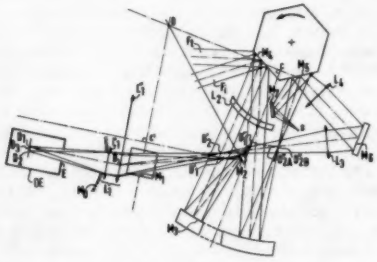


1. Sensing apparatus for determining the relative position of two bodies located at a distance from one another with respect to a predetermined reference position comprising: a camera having an areal matrix of photosensitive elements arranged in the image plane thereof mounted at one of said bodies; a shading member provided at the other of said bodies projecting from the surface thereof; and means defining an optically clearly distinguishable reference pattern in the area of the base of said shading member, said reference pattern being formed by means of a plurality of light sources each emitting a light pattern which is as punctiform as possible with said reference pattern being linearly or areally distributed outside of said base of said shading member; said reference pattern being partially covered in an asymmetric manner by said shading member during a deviation of said two bodies from said reference position.

4,710,621
OPTO-MECHANICAL SCANNER WITH FIXED-FIELD RANGING DEVICE

Fernand R. Loy, Sceaux, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 814,841, Dec. 30, 1985, abandoned. This application Mar. 9, 1987, Ser. No. 23,894
Claims priority, application France, Jan. 11, 1985, 85 00338
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—203 R **11 Claims**

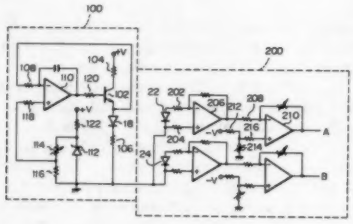


1. An opto-mechanical scanner having a scanning function and an associated ranging function, the scanning field being obtained by line-scanning and frame scanning means and the ranging field being fixed during the propagation time of a ranging echo the ranging source, being a laser, the beams issuing from said fields converging on a scanning detector array and on a ranging detector respectively, which are arranged in the same cooled space, characterized in that said scanning beam and said ranging beam traverse a common entrance optical system and an arrangement of fixed optical elements arranged to make said beams follow two different optical paths such that the ranging beam traverses said line-scanning means twice, which ensures that it has a fixed orientation which is independent of the line scanning, said scanning function and said ranging function being simultaneously and requiring no switching of optical elements, and the laser pulse being emitted in a specific position of said line-scanning and frame scanning means.

4,710,622
DEVICE FOR STABILIZING PHOTOSENSOR OUTPUT TO VARYING TEMPERATURE

Tomotsu Imamura, Isehara, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 26, 1985, Ser. No. 759,320
Claims priority, application Japan, Jul. 31, 1984, 59-161974
Int. Cl.[4] H01V *40/14*
U.S. Cl. 250—214 R **7 Claims**



1. A device for stabilizing an output of a photosensor which includes a light-emitting element supplied with a current from a power source for emitting light and a light-receiving element for generating an output responsive to the light incident thereto from the light-emitting element, said device comprising:

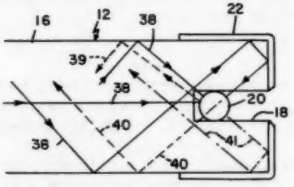
resistor means connected in series with said light-emitting element; and

voltage control means which maintains a constant voltage across the series connected light-emitting element and said resistor means whereby the output of said light-receiving means is substantially constant over a wide temperature range.

4,710,623
OPTICAL FIBER CATHETER WITH FIBER-CONTAINED REACTIVE ELEMENT

David Lipson; Benjamin L. Liu, and Nicolas G. Loebel, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 27, 1986, Ser. No. 833,245
Int. Cl.[4] H01J *5/16*
U.S. Cl. 250—227 **20 Claims**



1. An elongated optical fiber apparatus for transmitting an incident light signal toward a first end of the apparatus, the first end situated in a fluid, and for transmitting a returning light signal toward a second end of the apparatus that is indicative of a specified characteristic of the fluid, the second end being situated outside the fluid, the apparatus comprising:

a light-conductive cable containing only a single optical fiber capable of transmitting light;

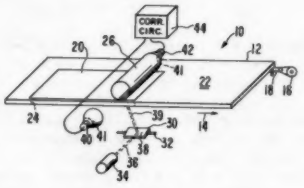
a hole formed in the first end of the single fiber;

a reactive element inserted into said hole to react with the contents of the fluid to alter a property of the light that is indicative of a specified characteristic of the fluid.

4,710,624
APPARATUS AND METHOD FOR MEASURING LIGHT TRANSMITTANCE OR REFLECTANCE

Robert Alvarez, Mountain View; Leonard Lehmann, Redwood City, and Bruno Strul, Palo Alto, all of Calif., assignors to DigiRad Corporation, Palo Alto, Calif.

Filed May 10, 1984, Ser. No. 608,747
Int. Cl.[4] G02B *26/10*
U.S. Cl. 250—228 **20 Claims**



11. In scanning apparatus for taking transmittance or reflectance measurements from a radiation transmitting or reflecting sheet mounted in an operative position so that the sheet can be exposed for being scanned along a line by a radiation beam comprising:

means for directing a beam of radiation onto the sheet and

along a line in scanning relationship thereto when the sheet is in said operative position;

means defining an elongated cavity having a radiation-receiving slot therein to allow radiation from the line scanning across the sheet to pass into the cavity, the cavity defining means having a radiation-reflecting surface to allow the radiation entering the cavity to be reflected;

photodetector means for sensing at the ends of the cavity the radiation reflected in the cavity and for generating an electronic signal corresponding to the sensed radiation; and

circuit means coupled with the photodetector means for correcting the signal for variations in the intensity of the radiation entering the cavity as a function of the distance along the slot during scanning of the beam.

4,710,625

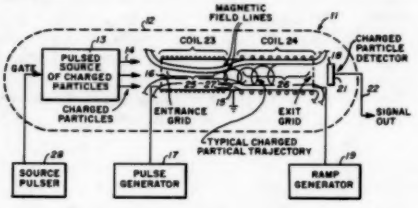
CHARGED PARTICLE ENERGY ANALYZER BASED UPON ISENTROPIC CONTAINMENT

Michael A. Kelly, Portola Valley, Calif., assignor to Kevex Corporation, Foster City, Calif.

Filed Oct. 15, 1985, Ser. No. 787,098

Int. Cl.⁴ H01J *49/44*

U.S. Cl. 250—305 **20 Claims**



1. In a method for analyzing the energies of charged particles, the steps of:

generally isentropically trapping the charged particles to be analyzed in an evacuated containment region;

mixing the axial and orbital momenta of the trapped charged particles so that an individual particle cyclically experiences periodic maximum and minimum axial momenta with corresponding minimum and maximum orbital momenta; and

analyzing the energy of the particles by selectively extracting from the containment region those particles having a maximum axial momenta exceeding a predetermined threshold energy level.

4,710,626

RADIATION IMAGE RECORDING AND READ-OUT METHOD AND APPARATUS

Kenji Takahashi; Chiyuki Umemoto, and Hisatoyo Kato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 484,738, Apr. 13, 1983. This application Jul. 7, 1986, Ser. No. 883,287

Claims priority, application Japan, May 19, 1982, 57-84437

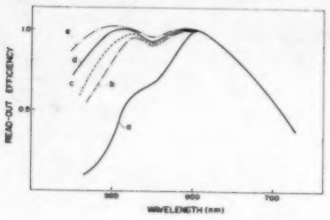
Int. Cl.⁴ G03C *5/16*

U.S. Cl. 250—327.2 **21 Claims**

1. A radiation image recording and read-out method including the steps of:

(i) recording a radiation image of an object on a recording material comprising a stimulable phosphor layer by exposing said recording material to a radiation passing through the object to have the radiation absorbed in said recording material, and

(ii) scanning said recording material carrying said radiation image stored therein with a laser beam which has a wavelength within the stimulation range of said stimulable phosphor and which causes said recording material to emit light in the pattern of said radiation image stored therein upon stimulation thereof by using a gas ion laser beam, the wavelength of which is selected to improve read-out efficiency and wherein the selected wavelength



is at least 480 nm and less than 600 nm, and reading out the emitted light by use of a photoedetector to obtain an electric signal corresponding to said radiation image.

4,710,627

METHOD AND AN APPARATUS FOR DETERMINING THE GENUINENESS OF A SECURITY BLANK

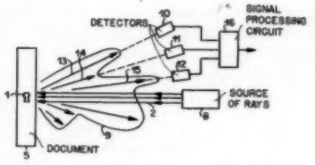
Heinrich P. Baltes, Zug, and André M. J. Huiser, Lausanne, both of Switzerland, assignors to Lgz Landis & Gyr Zug AG, Zug, Switzerland

Division of Ser. No. 364,256, Apr. 1, 1982, abandoned. This application Feb. 26, 1985, Ser. No. 705,741

Claims priority, application Switzerland, Apr. 16, 1981, 2558/81

Int. Cl.⁴ G01J *1/00*

U.S. Cl. 250—339 **17 Claims**



1. In a method of determining the genuineness of a security blank, including an elongated security thread of predetermined dimensions, said security thread having a cross-section constant throughout a portion of its length and other than circular or rectangular,

the steps comprising

securing said elongated thread to said security blank,

directing rays of electromagnetic radiation having a wavelength of the order of said predetermined dimensions onto said security thread, at least some of said rays being scattered form said security thread in a preconceived characteristic manner,

detecting the rays scattered from said security thread as a function of the angle between the incident rays directed onto said security thread and the scattered rays therefrom and

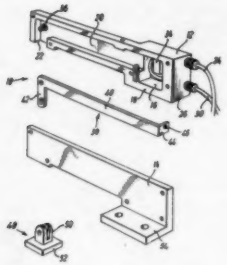
electronically processing the measured angular distribution of intensity of said scattered rays to determine whether said radiation has been scattered in a preconceived characteristic manner from said security thread, whereby the genuineness of said security blank is determined by a comparison of said characteristic angular distribution of the intensity of the detected radiation with predetermined stored values.

4,710,628

FAULT DETECTING APPARATUS

Barry J. Jordan, Heage, England, assignor to Jordon Instruments (Derby) Limited, England

Filed Dec. 18, 1985, Ser. No. 810,182
Int. Cl.[4] G01J 1/00; G01F 23/00
U.S. Cl. 250—341 6 Claims



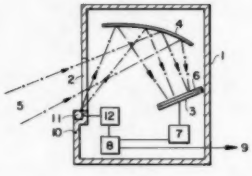
1. Apparatus for detecting a structural fault in a material, said apparatus comprising a substantially closed body, sensing means which is pivotally mounted within the body and which provides a first part extending externally of the body for continuous engagement with the material to thereby directly detect any structural fault therein, and a second part presenting a path for transmission of energy therethrough, means for transmitting a beam of said energy and means for receiving the beam of said energy, said second part of the sensing means being normally positioned with the transmission path aligned with the transmitting and receiving means, but being movable in the event of a structural fault on the material being continuously monitored by said first part, whereby to affect the transmission of energy, the energy transmitting means comprising a first fibre optic cable connected to the body with an end located therein for transmission of light into the body and the energy receiving means comprising a further fibre optic cable having an end within the body aligned with said end of the first cable.

4,710,629

INFRARED INTRUSION DETECTOR

Kurt Müller, Stäfa, and Walter Meier, Männedorf, both of Switzerland, assignors to Cerberus AG, Mannedorf, Switzerland

Filed Dec. 26, 1985, Ser. No. 813,508
Claims priority, application Switzerland, Jan. 8, 1985, 00058/85
Int. Cl.[4] G01J 5/08
U.S. Cl. 250—342 19 Claims



1. An infrared intrusion detector, comprising:
a housing having an entrance window defining at least one reception zone of the detector;
said entrance window being transparent to external infrared radiation;
an infrared dual sensor for generating an output signal in response to externally impinging infrared radiation enclosed in said housing;
an optical arrangement for directing external infrared radiation entering said housing through said entrance window from predetermined ones of said at least one reception zone to said infrared dual sensor;
an evaluation circuit connected to said infrared dual sensor for generating a first alarm signal in response to a predetermined type of change in said output signal;
an infrared radiation source for emitting checking infrared radiation and contained in said housing and constructed and arranged such that said checking infrared radiation irradiates said infrared dual sensor after traversing said entrance window;
said evaluation circuit being constructed for additionally generating a second alarm signal in response to a predetermined degree of attenuation of said checking infrared radiation to indicate possible sabotage of the infrared intrusion detector;
said infrared dual sensor comprising a first sensor element and a second sensor element arranged in proximate relationship to one another;
said first sensor element being irradiated with said checking infrared radiation by said infrared radiation source in a first predetermined manner;
said second sensor element being irradiated with said checking infrared radiation by said infrared radiation source in a second predetermined manner; and
differential circuit means interconnecting said first sensor element and said second sensor element.

4,710,630

OPTICAL DETECTION SYSTEM

John D. Kuppenheimer, Jr., Tewksbury, Mass., and Kirby A. Smith, Derry, N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Aug. 7, 1985, Ser. No. 763,158
Int. Cl.[4] G01J 3/36
U.S. Cl. 250—353 8 Claims

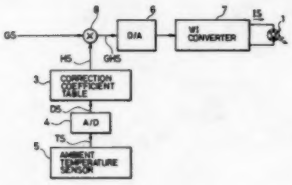
1. An optical system for applying radiation from the same field of view onto separate portions of a detector, comprising:
an angle converting cone having an input opening and a smaller output opening;
means for imaging radiation from a predetermined field of view at a point in a plane at the input opening of said angle converting cone; and
detection means disposed at the output opening of said angle converting cone.

4,710,631

TEMPERATURE COMPENSATION FOR A SEMICONDUCTOR LIGHT SOURCE USED FOR EXPOSURE OF LIGHT SENSITIVE MATERIAL

Yasuo Aotsuka; Masahiro Konishi, and Koji Takahashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 27, 1985, Ser. No. 769,915
Claims priority, application Japan, Aug. 28, 1984, 59-179035; Aug. 29, 1984, 59-180131
Int. Cl.[4] G03B 27/72; G05D 25/02
U.S. Cl. 250—354.1 3 Claims



1. In an image forming method wherein a light-sensitive material having spectral sensitivity characteristics with a peak value is exposed under a semiconductor light source, the improvement comprising:

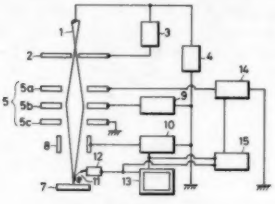
rendering a center wavelength of variations in peak spectral radiation due to variation of temperature from said light source substantially equal to a wavelength for peak spectral sensitivity of said light-sensitive material, and compensating any temperature-dependent variations in said radiation intensity of said light source.

4,710,632

ION MICROBEAM APPARATUS

Tohru Ishitani, Sayama; Hideo Todokoro, Nishitama; Yoshimi Kawanami, Kokubungi, and Hifumi Tamura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 13, 1985, Ser. No. 733,632
Claims priority, application Japan, May 18, 1984, 59-98712
Int. Cl.[4] H01J 37/04, 37/10
U.S. Cl. 250—396 R 8 Claims



1. An ion microbeam apparatus comprising:

an ion source;

acceleration power supply means for accelerating ions extracted from the ion source;

electrostatic lens means for adjusting focusing of accelerated ions, the electrostatic lens means including at least three electrodes with an intermediate electrode and at least two other electrodes disposed so that respective ones of the at least two other electrodes are arranged on opposite sides of the intermediate electrode;

first power supply means for supplying a high potential to said intermediate electrode of said electrostatic lens means;

ion beam diameter measuring means for measuring the diameter of an ion beam impinging on a sample and providing an output indicative thereof; and

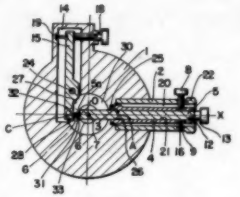
second power supply means for supplying a low potential to one of the at least two other electrodes of the electrostatic lens means for finely adjusting the focusing of the accelerated ions in response to the output from the ion beam diameter measuring means so as to enable the ion beam to assume an optimum diameter.

4,710,633

SPECIMEN MOVING DEVICE FOR ELECTRON MICROSCOPE

Shigeru Suzuki, Tachikawa, Japan, assignor to Akashi Seisakusho Ltd., Tokyo, Japan

Filed Dec. 11, 1985, Ser. No. 807,858
Claims priority, application Japan, Feb. 9, 1983, 58-160557
Int. Cl.[4] H01J 37/20
U.S. Cl. 250—442.1 3 Claims



1. A specimen moving apparatus for an electron beam apparatus comprising:

a specimen holder mounted on a lens column defining an electron beam axis, said specimen holder extending slideably in a direction orthogonal to the electron beam axis and being mounted rotatably in a direction substantially orthogonal to the electron beam axis, said specimen holder having an outwardly curved end face;

a lever member disposed in the vicinity of a distal end of said specimen holder in a direction perpendicular to said specimen holder for slideably moving said holder; and

a coupling member interposed between said lever member and said specimen holder for operatively interconnecting said lever member and said specimen holder;

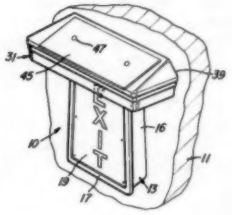
said coupling member having an apex and a bottom surface, said apex engaging a notch provided on a lateral portion of said lever member and said bottom surface being curved about said apex and rollingly engaging said end face of said specimen holder.

4,710,634

SANITARY DOOR HANDLE HAVING AN UPPER HOUSING AND A SPACER ELEMENT

Richard L. Brookes, 2894 General Motors Blvd., Detroit, Mich. 48202

Filed Apr. 14, 1986, Ser. No. 851,956
Int. Cl.[4] G01N 21/00
U.S. Cl. 250—455.1 10 Claims



1. A sanitary door handle comprising:

a plate having a pushing surface facing away from the door;

a spacer element mounting and interconnecting the plate and door;

a peripheral flange upon the spacer extending outwardly from the plate;

said flange having a gripping surface spaced from and facing the door;

a housing being located above the plate;

said housing including a removable cover and also including a light chamber within the housing;

said light chamber including an ultraviolet germicidal light source;

said cover including a downwardly and forwardly slanted top having a cut away rectangular recess therein, a corresponding shaped access plate being nested within the cover recess; and

shielding means supported on and depending from the cover and enclosing the light source for directing the ultraviolet germicidal light upon the pushing and gripping surfaces to thereby sanitize the handle and shield points above the housing from exposure to the ultraviolet light.

4,710,635

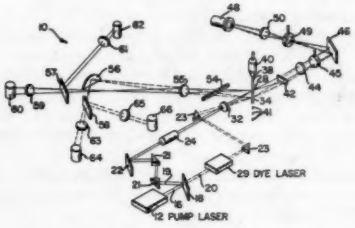
DUAL LASER EXCITATION FROM SINGLE LASER SOURCE

Vernon L. Chupp, Los Alto, Calif., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Apr. 14, 1986, Ser. No. 852,007

Int. Cl.[4] G01N *21/64*

U.S. Cl. 250—461.2 **22 Claims**



1. A flow cytometry apparatus for determining characteristics of cells or the like flowing in a liquid stream comprising:

means for moving cells, substantially one at a time, in a liquid flow stream;

a first excitation light source for providing a first beam of light;

a dichroic element positioned in the path of said light beam for transmitting a portion of said light and for reflecting a portion of said light;

dispersive means for spectrally separating wavelengths of the light reflected by said dichroic element and directing said spectrally separated light toward said cells moving in said flow stream to provide a first area of illumination therefor;

a second excitation light source positioned to receive the light transmitted through said dichroic element and adapted to be driven by the energy of said transmitted light for producing a second beam of light which is directed toward said cells moving in said flow stream to provide a second area of illumination therefor;

means for detecting light associated with each moving cell as it passes through said areas of illumination; and

means for using said detected light to determine one or more characteristics of said cells.

4,710,636

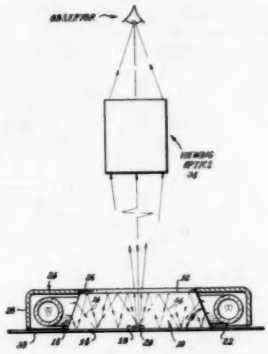
RETICLE PLATE HAVING A FLUORESCING PATTERN

Ronald J. Martino, Geneva, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Aug. 31, 1984, Ser. No. 646,666

Int. Cl.[4] F21K *2/00*

U.S. Cl. 250—467.1 **10 Claims**



1. In an optical instrument having a viewing system for viewing photographic film and a referencing assembly for assisting in location of specific points upon the film being viewed, said referencing assembly comprising:

(a) a reticle plate positioned so as to be in close proximity to the film being viewed by the optical instrument, said reticle plate being constructed to totally internally reflect light emitted by a preselected source of illumination, said reticle plate including a reticle pattern thereon which is highly fluorescent when activated by light emitted by a preselected source of illumination;

(b) a source of illumination having predetermined lightwave characteristics, said source being mounted with respect to said reticle plate such that, when energized, light rays emitted therefrom enter and are totally internally reflected within said reticle plate and at least a portion of the totally internally reflected light rays strike and fluoresce said reticle pattern thereby causing said reticle pattern to become highly visible in the viewing system of the optical instrument; and

(c) means cooperative with said source of illumination for substantially blocking non-refracted illumination emitted by said source of illumination in its energized mode from entering the viewing system of the optical instrument.

4,710,637

HIGH EFFICIENCY FLUORESCENT SCREEN PAIR FOR USE IN LOW ENERGY X RADIATION IMAGING

George W. Luckey; Bernard Roth; Kathleen E. Brendel, and Margaret S. Den Dunne, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 827,683, Feb. 10, 1986, abandoned. This application Dec. 22, 1986, Ser. No. 944,893

Int. Cl.[4] G01J *1/58*

U.S. Cl. 250—486.1 **7 Claims**

1. A pair of front and back intensifying screens capable of providing a sharp imagewise exposure of a dual coated silver halide radiographic element to light when imagewise exposed to X-radiation predominantly of an energy level below 40 keV,

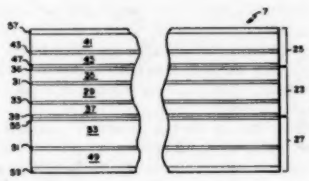
the front intesifying screen being comprised of a fluorescent layer

having modulation transfer factors greater than those of reference curve A in FIG. 3 and

being capable of attenuating by 20 to 60 percent a reference X radiation exposure produced by a Mo target tube operated at 28 kVp with a three phase power

supply, wherein the reference X radiation exposure passes through 0.03 mm of Mo and 4.5 cm of poly(-methyl methacrylate) to reach said fluorescent layer mounted 25 cm from a Mo anode of the target tube and attenuation is measured 50 cm beyond the fluorescent layer, and

the back intensifying screen



having modulation transfer factors greater than those of reference curve B in FIG. 3 and

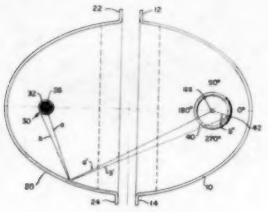
being capable of attenuating at least 60 percent of the X radiation received from the front screen when the reference exposure is repeated with both the front and back screens present.

4,710,638

APPARATUS FOR TREATING COATINGS

Charles H. Wood, Rockville, Md., assignor to Fusion Systems Corporation, Rockville, Md.

Filed Feb. 10, 1986, Ser. No. 827,587
Int. Cl.[4] G01J *1/00*; G02B *5/10*; G21K *5/00*
U.S. Cl. 250—492.1 **9 Claims**



1. Apparatus for treating material with concentrated radiant energy comprising:

(a) first and second reflectors comprising an elliptical reflector having a source focus and an object focus;

(b) a volume radiant energy source positioned at said source focus;

(c) means for positioning material to be treated with radiant energy at said object focus; and,

(d) an auxiliary reflector having a concave reflecting surface, said auxiliary reflector being positioned near said object focus and having its concave surface facing both foci of the elliptical reflector so as to direct towards said object focus at least a portion of the radiation which originates at said source and strikes the auxiliary reflector.

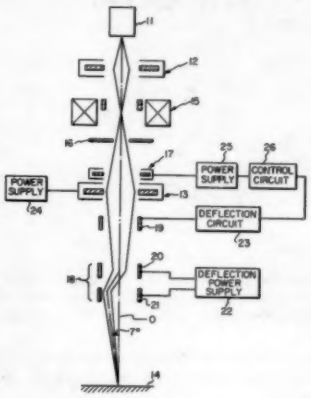
4,710,639

ION BEAM LITHOGRAPHY SYSTEM

Hiroshi Sawaragi, Tokyo, Japan, assignor to Jeol Ltd., Tokyo, Japan

Filed Apr. 15, 1986, Ser. No. 852,185
Claims priority, application Japan, Apr. 18, 1985, 60-83355
Int. Cl.[4] H01J *37/302*
U.S. Cl. 250—492.2 **3 Claims**

1. A doping ion beam implantation lithography system comprising, in sequence, an ion source for generating an ion beam, means for focusing the ion beam emanating from said ion source onto a substrate material to be patterned, and deflecting means for deflecting the beam comprising means to vary the position on the substrate material illuminated by the beam to draw a pattern on the substrate material, an additional deflection means consisting of a deflecting element of a first stage for



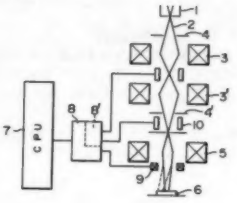
deflecting the beam in a one direction, a deflecting element of a second stage for deflecting the beam in the opposite direction, and means for coordinating said first and second stages so that the beam is deflected at a constant incident angle that is sufficiently less than 90 degrees to avoid channeling of the implanted ions in surface crevices.

4,710,640

ELECTRON BEAM LITHOGRAPHY

Katsuhiro Kawasaki, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 22, 1985, Ser. No. 757,285
Claims priority, application Japan, Jul. 24, 1984, 59-153703
Int. Cl.[4] H01J *37/00*
U.S. Cl. 250—492.2 **4 Claims**



1. An electron beam lithography method comprising the steps of:

generating an electron beam;

shaping said electron beam;

focusing the shaped electron beam on a sample;

selectively permitting the focused electron beam to pass through aperture means so that the surface of said sample is exposed to the focused electron beam; and

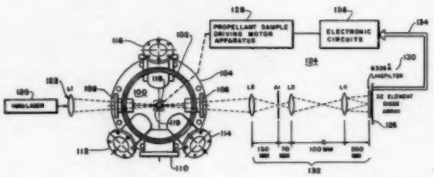
blanking said electron beam by deflecting said electron beam in one direction to one side of said aperture means, unblanking said electron beam by enabling said electron beam to pass through an aperture of said aperture means, and blanking said electron beam by deflecting said electron beam to the opposite side of said aperture means, respectively, in sequence.

4,710,641

PROPORTIONAL DRIVE SERVO CONTROLLER WITH ARRAYED POSITION DETECTOR

James M. Aulds, Oxford, and Roger J. Becker, Kettering, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 27, 1986, Ser. No. 879,718
Int. Cl.[4] G01N *21/86*
U.S. Cl. 250—554 **15 Claims**



1. Apparatus for maintaining the eroding burn surface of a movable solid rocket propellant sample positioned along an axial path within the limited depth of field of a camera system comprising:

electromechanical means for advancing said propellant sample along said axial path in response to an electrical driving signal;

a linear array of optical-to-electrical transducer elements disposed along said axial path adjacent said propellant sample and optical eclipse responsive to both said burn surface eroding and said propellant sample feeding;

means for determining the number of said transducer elements illuminated and the number eclipsed by said propellant sample at each instantaneous position of said burn surface;

means for storing numerical values representing the number of illuminated transducer elements found in two successive samples of an output signal from said means for determining;

means for converting one of said stored numeric values to an analog signal; and

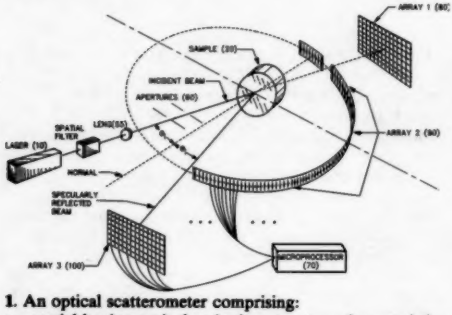
means for generating said electrical driving signal in response to the difference between said analog signal and a first reference signal.

4,710,642

OPTICAL SCATTEROMETER HAVING IMPROVED SENSITIVITY AND BANDWIDTH

John R. McNeil, 13423 Desert Hills NE., Albuquerque, N. Mex. 87111

Filed Aug. 20, 1985, Ser. No. 767,611
Int. Cl.[4] G01N *21/86*
U.S. Cl. 250—571 **10 Claims**



1. An optical scatterometer comprising:

a material having optical and microstructure characteristics to be analyzed;

laser means for transmitting an incident laser beam to irradiate a spot on the material;

a first array of optical detectors positioned to detect the incident laser beam in the absence of said material for characterizing the optical characteristics of the incident laser beam;

a second array of optical detectors positioned in a plane containing the incident laser beam and further positioned in a circular arc whose center coincides with the spot on the material irradiated by the incident laser beam, said second array of optical detectors being operative for detecting indications of both back-scattered and forward-scattered light resulting from irradiation of said spot on said material;

a third array of optical detectors positioned to detect a specularly reflected beam of light from said material; and

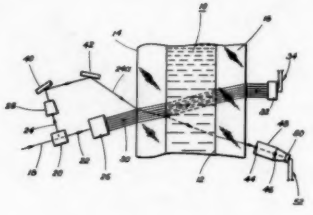
microprocessor means coupled to the first, second, and third arrays of optical detectors for processing electrical signals received therefrom to provide an indication to the user of the optical characteristics of the incident laser beam and of the optical and microstructure characteristics of said material.

4,710,643

METHOD AND APPARATUS FOR DETERMINING THE DEGREE OF PURITY OF A LIQUID

Charles S. Schmukler, Flushing, and Georges A. Buon, Whitestone, both of N.Y., assignors to Marine Moisture Control Company, Inc., Inwood, N.Y.

Filed Aug. 8, 1986, Ser. No. 894,956
Int. Cl.[4] G01N *15/06*
U.S. Cl. 250—573 **18 Claims**



1. A method for monitoring the purity of a liquid, comprising the steps, of:

providing a laser beam;

dividing the laser beam into first and second portions prior to directing the beam through the liquid;

positioning a pair of windows on opposite sides of the liquid container;

impinging the first portion of the beam onto a beam expander directed towards one of said windows for passing said first portion through the liquid in a direction to exit through the other side of said windows to thereby survey a relatively large area of the liquid;

impinging the second portion of the beam onto a mirror arrangement to change the angle of entry of the second portion into the liquid so that it passes through the liquid at an angle different from the direction of travel of the first portion;

detecting the first portion of the beam after it exits from said second window to detect the amount of the solid particles present in the liquid;

detecting the second portion of the beam after it exits from the second window; and

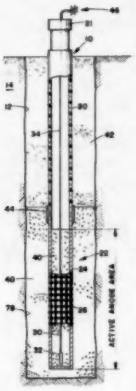
sensing any deviations of the path of the second portion through the liquid as a result of changes in the liquid from its pure state in response to change in refraction effect on said second portion as it passes through the liquid.

4,710,644

REPLACEABLE DEEP ANODE SYSTEM

Michael K. Baach, Houston, Tex., assignor to Corrpro Companies, Inc., Medina, Ohio

Filed Oct. 30, 1985, Ser. No. 792,963
Int. Cl.[4] C23F *13/02*
U.S. Cl. 307—95 11 Claims



1. An anode assembly for cathodic protection of subterranean structures comprising in combination:

an elongated anode casing having a first upper electrically non-conductive portion and a second lower electrically conductive portion, said second portion comprising an electrically conductive wall including an electrically conductive polymer coating;

an anode received in said casing;

electrically conductive material received in said casing contiguous to said anode and further disposed about an outer wall surface of said casing second portion; and,

means for supplying electrical energy to said anode whereby electrical energy flows from said anode through said electrically conductive materials and through said polymer coating to cause the subterranean structures to become cathodic and thereby substantially prevent corrosion of such structures.

5. A replaceable deep anode system for the cathodic protection of underground metallic structure comprising:

a rigid casing received within a drilled hole, said casing having a top portion of non-conductive material and a lower portion of substantially chemically inert conductive material, generally defining a system active anode area;

an anode received within said lower portion;

means for selectively positioning said anode in said lower portion;

electrically conductive material received within and about said casing at said active anode area to provide an electrically conductive path from said anode through said casing lower portion and to the drilled hole; and,

means for supplying electrical energy to the anode whereby upon sacrificial corrosion of the anode, the anode may be selectively retrieved and replaced in said casing while maintaining the integrity of the drilled hole indefinitely.

10. A replaceable anode system for the cathodic protection of underground metallic structures comprising:

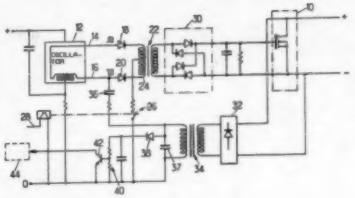
an anode casing having an electrically non-conductive, dimensionally stable portion and a substantially incorrodible, dimensionally stable, electrically conductive portion, a selectively insertable anode received in the casing contiguous to the conductive portion, and electrically conductive material received in said casing adjacent the anode and about the casing conductive portion whereby said casing provides an integral anode housing for selective removal and resupply of anodes.

4,710,645

DEVICE FOR MONITORING THE STATE OF AN ELECTRIC SWITCH OR AN ELECTRIC RELAY

Pierre O. Doittau, Villiers St Frederic, and Hervé Moal, Velizy, both of France, assignors to Matra, Paris, France

Filed May 28, 1986, Ser. No. 867,475
Claims priority, application France, May 30, 1985, 8508134
Int. Cl.[4] H03K *17/687*
U.S. Cl. 307—115 7 Claims



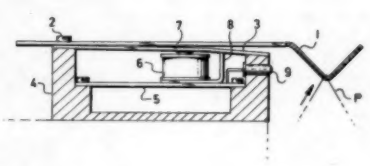
1. A device for monitoring an operating state of an electrical switch having a pair of output terminals, said switch, when in a closed state, having an impedance across terminals thereof lower than the impedance when said switch is in an open state by several orders of magnitude, comprising: an insulating transformer having a first winding and a second winding; rectifier means for connecting the first winding across said terminals of the switch; oscillator means having an impedance substantially higher than that of said second winding when said switch is in closed condition and in electric series relation with said second winding; and analysing means connected to said second winding and responsive to a signal received from said second winding.

4,710,646

THREAD MOVEMENT SENSOR

Otakar Curda; Jaroslav Maxa, and Pavel Uhlir, all of Trebic, Czechoslovakia, assignors to Elitex koncern textilniho strojirenstvi, Liberec, Czechoslovakia

Filed Apr. 3, 1986, Ser. No. 847,499
Claims priority, application Czechoslovakia, Apr. 3, 1985, 2463-85
Int. Cl.[4] D01H *13/16;* B65H *25/14;* D03D *51/28;* D01G *31/00*
U.S. Cl. 307—116 5 Claims



1. Device for detecting the presence and movement of a thread under tension and for stopping a thread manipulating machine when the tension of the thread changes by a predetermined desired amount comprising

an arm having a thread guide at one end and being fixed at its other end to a body, said body containing a coil wherein said arm and said coil form part of a magnetic circuit, such that movement of said arm results in a change in the magnetic flux of said magnetic circuit, said thread passing over said thread guide so as to deflect said arm with respect to said coil

whereby said arm and said coil function as a contactless switch to signal movement of the arm by providing a corresponding change in the magnetic flux of the coil such that the magnitude of any change in flux of said coil corre-

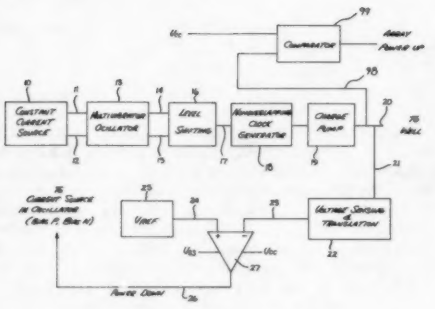
sponds to the magnitude of any movement of the arm, the movement of the arm thereby being able to be measured electronically by measuring the change in the magnetic flux of the coil.

4,710,647

SUBSTRATE BIAS GENERATOR INCLUDING MULTIVIBRATOR HAVING FREQUENCY INDEPENDENT OF SUPPLY VOLTAGE

Ian Young, Portland, Oreg., assignor to Intel Corporation, Santa Clara, Calif.

Filed Feb. 18, 1986, Ser. No. 830,469
Int. Cl.[4] H03L *1/00*; G05F *1/56*
U.S. Cl. 307—297 **18 Claims**



1. A device for biasing a well of a first conductivity type to a well voltage, exceeding a first voltage by a first reference voltage, said device comprising:

current generating means having first and second outputs, said current generating means for producing a current independent of said first voltage;

frequency generating means coupled to said first and second outputs, said frequency generating means having third and fourth outputs;

level shifting means coupled to said third and fourth outputs, said level shifting means for raising the voltage level of said third and fourth outputs;

clock generating means coupled to said level shifting means, said clock generating means for generating a plurality of clocking signals;

charge pumping means coupled to said clock generating means, said charge pumping means for biasing said well;

first comparing means coupled to said well, said first comparing means for comparing said well voltage to said first reference voltage, said first comparing means having a fifth output coupled to said frequency generating means for controlling the output of said frequency generating means.

4,710,648

SEMICONDUCTOR INCLUDING SIGNAL PROCESSOR AND TRANSIENT DETECTOR FOR LOW TEMPERATURE OPERATION

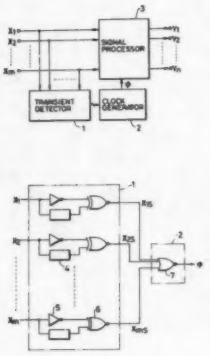
Shoji Hanamura, Kodaira; Masaaki Aoki, Minato, and Toshiaki Masuhara, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 6, 1985, Ser. No. 731,014
Claims priority, application Japan, May 9, 1984, 59-90960; Jul. 25, 1984, 59-152834; Sep. 29, 1984, 59-205311
Int. Cl.[4] H03K *17/16, 19/20*
U.S. Cl. 307—443 **4 Claims**

1. A semiconductor device for low-temperature operation comprising:

a signal processing circuit having at least one input for receiving at least one input signal and at least one output, said signal processing circuit being comprised of a logic gate which includes a load transistor and at least one drive transistor, wherein the drive transistor receives the input signal at said input and provides a logic output at said output in connection with the load transistor;

an input signal transient detector including means for detecting a change of a state of said at least one input signal and means for outputting a signal-processing commencing signal to said signal processing circuit in response to a



detected change of state of said at least one input signal; and

charge supply means including means for receiving the signal-processing commencing signal and for supplying electric charge to a circuit node in the signal processing circuit,

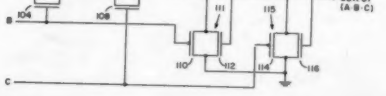
wherein said load transistor is activated when at least one input signal changes, and said signal processing circuit and charge supply means are operated in a range of temperature below 200K.

4,710,649

TRANSMISSION-GATE STRUCTURED LOGIC CIRCUITS

Edward T. Lewis, Sudbury, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 11, 1986, Ser. No. 850,642
Int. Cl.[4] H03K *19/094*
U.S. Cl. 307—451 **9 Claims**



1. A logic circuit for converting a plurality of input logic signals into an output logic signal representative of a predetermined logical combination of the plurality of input logic signals comprising:

a plurality of electronic switch means, each of said switch means having an input terminal, an output terminal, a first control terminal and a second control terminal for coupling or decoupling the input terminal and the output terminal selectively in accordance with a logic state of a signal fed to the first and second control terminals;

a first one of said plurality of input logic signals being fed to an input terminal of a first one of said switch means;

a second one of said plurality of input logic signals being fed

to the first control terminal of said first one of said switch means;

a second one of said switch means having an input terminal coupled to the output terminal of said first one of said switch means;

a third one of said plurality of input logic signals being fed to the first control terminal of said second one of said switch means;

output terminals of a third one and a fourth one of said switch means coupled to the output terminal of said second one of said switch means and to an output of said logic circuit wherein: (i) said second one of said plurality of input logic signals being fed to the first control terminal of said third one of said switch means; (ii) said third one of said plurality of input logic signals being fed to the first control terminal of said fourth one of said switch means; and (iii) the input terminal of said third and fourth switch means being coupled to a signal having a predetermined reference potential representative of one of the logic states ofthe input logic signals;

a fourth one of said plurality of input logic signals being fed to the second control terminal of said first switch means and the second control terminal of said third switch menas; and

a fifth one of said plurality of input logic signals being fed to the second control terminal of said second switch means and the second control terminal of said fourth switch means.

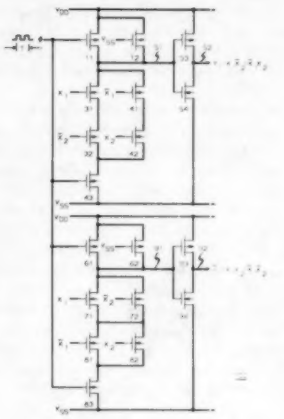
4,710,650

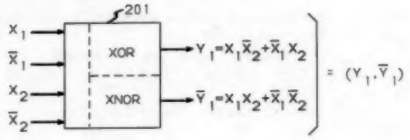
DUAL DOMINO CMOS LOGIC CIRCUIT, INCLUDING COMPLEMENTARY VECTORIZATION AND INTEGRATION

Masakazu Shoji, Warren, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 26, 1986, Ser. No. 900,579
Int. Cl.[4] H03K *19/003, 19/096*
U.S. Cl. 307—452 **7 Claims**

1. A domino CMOS logic circuit, operable on a succession of precharge and evaluation phases of a clock sequence, including a dual gate having first and second logic gate sections which are logic duals of each other, the first and second sections having first and second mutually complementarily interconnected arrays, respectively, of driver transistors that are respectively connected for receiving mutually complementary first and second sets, respectively, of logic input signals, whereby during each evaluation phase the first and second





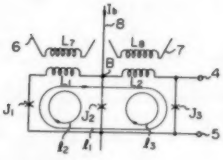
sections generate first and second outputs, respectively, that are the inverse of each other.

4,710,651

JOSEPHSON-JUNCTION LOGIC DEVICE

Hideo Suzuki, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 735,726, May 20, 1985, abandoned, which is a continuation of Ser. No. 428,481, Sep. 29, 1982, abandoned. This application Oct. 10, 1986, Ser. No. 917,313
Claims priority, application Japan, Sep. 30, 1981, 56-153886
Int. Cl.[4] H03K *19/195*
U.S. Cl. 307—462 **3 Claims**



1. A Josephson-junction logic device having inductances and forming and AND circuit, comprising:

at least two superconductive loops, each having at least two Josephson-junction elements and a loop inductance connected between each each of said at least two Josephson-junction elements, said at least two superconductive loops being connected so that two adjacent ones of said at least two superconductive loops commonly include one of said at least two Josephson-junction elements, each of said

Josephson-junction elements and each loop inductance forming a quantum interference elements;

at least two logic input signal lines, operatively connected to receive input currents, for supplying logic input signals, each of said logic input signal lines being independently arranged to be opposite one loop inductance forming a quantum interference elements, for magnetically coupling with said one loop inductance forming a quantum interference elements;

a bias line, operatively connected to said at least two superconductive loops, for supplying a bias current to said at least two superconductive loops, said bias current satisfying the condition $|I_{ml}| > |I_{mo}|$, where I_{ml} is a first threshold current, for switching said AND circuit, determined when said at least two logic input signal lines receive different magnitude input currents and where I_{mo} is a second threshold current for switching said AND circuit, determined when said at least two logic input signal lines receive the same magnitude input currents; and

output terminals, operatively connected ton one of said at least two Josephson-junction elements, for outputting a logic output signal as a result of a logic operation performed on said logic input signals, whereby an operating margin of the AND circuit is expanded.

4,710,652

INTERFERENCE SIGNAL COMPONENT COMPENSATION CIRCUIT

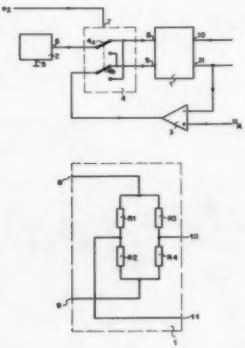
Jan Petr, Oberwil, Switzerland, assignor to Lgz Landis & Gyr Zug AG, Zug, Switzerland

Filed May 27, 1986, Ser. No. 867,490

Claims priority, application Switzerland, Feb. 10, 1986, 519/86

Int. Cl.[4] G01R *17/00;* **H03F** *15/00*

U.S. Cl. 307—491 **6 Claims**



1. An interference signal component compensation circuit for use with a four-pole device wherein two poles thereof form inputs and two poles thereof form outputs in which the output signal of said four-pole device is measured from one output relative to a base potential at the other output, comprising:

an amplifier having an inverting input coupled to the base potential on the other output of said four-pole device and having a non-inverting input operable for being coupled to a reference voltage, said amplifier having an output voltage which is proportional to the difference between said base potential and said reference voltage; and

a reversing two-pole switch connected to the inputs of said four-pole device and having one connection to the output of said amplifier and another connection operable for being coupled to a signal source; said reversing switch operable for reversing the connection of said signal source and said amplifier to the inputs of said four-pole device.

4,710,653

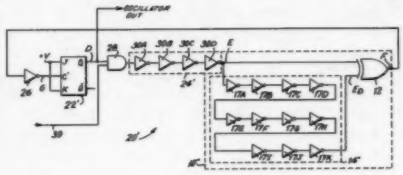
EDGE DETECTOR CIRCUIT AND OSCILLATOR USING SAME

Seening Yee, Port Washington, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jul. 3, 1986, Ser. No. 882,146

Int. Cl.[4] G01R *19/145;* **H03K** *5/13, 5/159, 5/22*

U.S. Cl. 307—518 **27 Claims**



1. An electronic circuit comprising:

delay and inverting means for logically inverting and delaying an input signal to supply a delayed and inverted pulse;

gate means having a first input for receiving said input signal and a second input for receiving said delayed and inverted signal, said gate means providing a logic output signal whenever said input signal and said delayed a inverted signal are at different logic levels;

delay means for delaying said input signal supplied to the input of the delay and inverting means and to the first input of the gate means; and

an additional gate means, said additional gate means having an input for receiving said logic output signal and an output connected to an input of the delay means, said additional gate means being configured so that a logic gate of pulses provided at an output thereof changes upon selected changes in state of said logic output signal.

4,710,654

DELAY CIRCUIT INCLUDING AN IMPROVED CR INTEGRATOR CIRCUIT

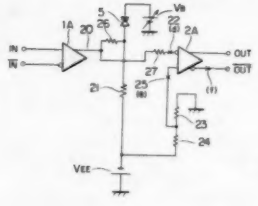
Takashi Saitoh; Nobuya Niizaki, both of Yokohama; Hideho Yamamura, Tokyo, and Shinichi Hayashi, Isezaki, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Electronics Engineering Co., Ltd., Kanagawa, both of, Japan

Filed Sep. 5, 1984, Ser. No. 647,484

Claims priority, application Japan, Sep. 5, 1983, 58-162081; Sep. 26, 1983, 58-176279

Int. Cl.[4] H03K *5/13, 5/01, 3/26*

U.S. Cl. 307—601 **2 Claims**



1. A delay circuit comprising:

a first comparator having at least one input for receiving an input signal for the delay circuit, and also having an open emitter output;

a second comparator having a non-inverting input and an inverting input, one of which is connected to the output of said first comparator, and an output for producing an output signal delayed from said input signal of said first comparator;

a CR integrator circuit comprising a first resistor, an second

resistor and a variable capacitance diode, of which one electrode of said first resistor is connected to the output of said first comparator and the other electrode is connected to one electrode of said variable capacitance diode, wherein one electrode of said second resistor is connected to a node between said first resistor and said variable diode and the other electrode of said second resistor is connected to a voltage supply, said first resistor controlling the rise-time of the output signal of said first comparator, and said second resistor controlling the fall-time of said output signal of said first comparator according to the time constant produced with said second resistor and the variable capacitance diode;

a variable voltage source connected to the other electrode of the variable capacitance diode to control the capacitance of said variable capacitance diode; and

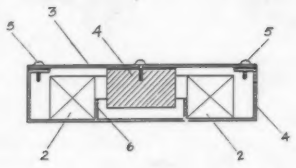
a reference voltage source connected to the other input terminal of said second comparator which is not connected to the first comparator.

4,710,655

RESONANT VIBRATION-TRANSMITTING APPARATUS

Kazumi Masaki, Osaka, Japan, assignor to Ken Hayashibara, Okayama, Japan

Filed Jun. 12, 1986, Ser. No. 874,016
Claims priority, application Japan, Jul. 1, 1985, 60-144172
Int. Cl.⁴ H02K *33/00*
U.S. Cl. 310—30 **8 Claims**



1. A vibrating device including

an apparatus comprising

(a) a vibrant leaf spring,

(b) an iron core attached to said vibrant leaf spring,

(c) a solenoid having a hollow tubular interior, and

(d) a yoke supporting said vibrant leaf spring and solenoid in such manner that said solenoid comes under said vibrant leaf spring, and that said iron core reciprocally moves in the interior of the solenoid in resonance with the frequency of a power source for activating said solenoid,

wherein

the ratio of the combined mass of said leaf spring plus iron core to that of said yoke plus solenoid is in the range of 1:2 to 1:10,

said apparatus has a top surface at which said vibrant leaf spring vibrates, and

said apparatus is mounted in an opening in the surface of a sponge by a plastic plate connected to said top surface of said apparatus and extending across said opening and on the surface of said sponge in the vicinity of said opening.

4,710,656

SPRING NEUTRALIZED MAGNETIC VIBRATION ISOLATOR

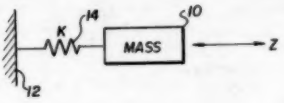
Philip A. Studer, 10313 Ridgemoore Dr., Silver Spring, Md. 20901

Filed Dec. 3, 1986, Ser. No. 937,208
Int. Cl.⁴ H02K *5/24*
U.S. Cl. 310—51 **26 Claims**

1. A vibration isolator for supporting a mass mounted on a base, comprising:

mechanical spring means, exhibiting a positive stiffness constant, and electromagnetic force means, exhibiting an effect of a negative stiffness constant, coupled between said mass and said base,

said electromagnetic force means further comprising, permanent magnetic circuit means including a pair of axially separated air gaps, magnetically permeable armature means extending between said air gaps and having a pair of magnetically permeable prominences partially shorting each of said air gaps, electromagnetic coil means encircling a selected portion of said armature means, and means for selectively energizing said electromagnetic coil means for generating differential magnetic forces across said air gaps and causing said armature to move in a predetermined direction in response to a control signal,



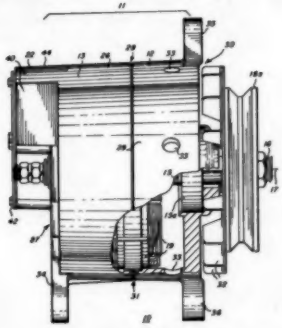
whereby a vibration isolator having a zero natural frequency response is provided exhibiting broadband attenuation of vibrational frequencies.

4,710,657

SEMI ENCLOSED ALTERNATOR

Alfred G. Ocken, Franklin Park, and Raymond E. Nordbrock, St. Charles, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 06/738,140, May 24, 1985. This application Sep. 9, 1986, Ser. No. 906,570
Int. Cl.⁴ H02K *9/02*
U.S. Cl. 310—62 **27 Claims**



1. An alternator suitable for agricultural or industrial construction use in which an atmosphere surrounding the alternator may have particle contaminants, comprising:

an alternator outer housing having front and rear housing portions joined together;

an alternator drive shaft coupled to the housing and having a first drive shaft portion positioned within the housing and a second drive shaft portion axially extending from said first portion and extending outward from and beyond at least the front housing portion, said drive shaft being rotatable with respect to the housing about a drive shaft axis;

a rotor assembly mounted on the first drive shaft portion and positioned within the outer housing;

a stator assembly mounted to and inside the outer housing for electrical/magnetic cooperation with the rotor assembly;

rectifying diode means secured to said outer housing and rectifying an AC output of at least one of said stator and

rotor assemblies and providing an alternator output signal in response to said rectified output;

wherein the improvement comprises,

said rear housing portion, at least after assembly of the alternator, having a generally cylindrical outer shape comprising substantially cylindrical sidewalls joined to a closed end portion and having an opposite open end facing said front housing portion, said rear housing cylindrical sidewalls and closed end portion forming a substantially air closed internal cavity except for said open end, said rear housing cylindrical sidewalls being generally concentric with respect to said shaft axis;

said front housing portion having a generally tubular outer shape comprising generally cylindrical sidewalls generally concentric with respect to said shaft axis, said front housing cylindrical sidewalls effectively terminating at substantially open first and second end openings, said first end opening facing said rear housing open end and said second end opening providing an opening to the ambient atmosphere surrounding said alternator, said drive shaft second portion axially extending outward from and beyond said front housing portion; and

fan assembly means mounted on said drive shaft and positioned concentrically about said axis and mounted external to said front housing portion, said second front housing end opening facing said fan assembly means, said fan assembly means, during normal driven rotation of said drive shaft, providing for air flow in a direction out of said second front housing end opening.

4,710,658

CONNECTION SOCKET FOR A SUBMERSIBLE ELECTRIC MOTOR

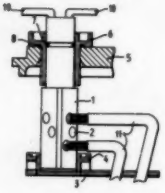
Torvald Stahl, Alvsjo, Sweden, assignor to ITT Industries, Inc., New York, N.Y.

Filed Oct. 16, 1986, Ser. No. 919,749

Claims priority, application Sweden, Oct. 23, 1985, 8504983

Int. Cl.[4] H02K *5/10, 3/50*

U.S. Cl. 310—71 **1 Claim**



1. A connection socket in a connection box for a submersible electric motor comprising in combination:

a first upper plate having a plurality of first mounting holes;

a second lower plate having a plurality of second mounting holes;

a first upper insulated holder mounted in one of said plurality of first holes;

a second lower insulated holder mounted in one of said plurality of second holes;

a connection pin, one end being mounted in said first insulated holder and another end being mounted in said second insulated holder, said one end having first connection means for connecting to incoming conductors, and said connection pin having second connection means adjacent said other end and positioned between said first and second plates for connecting to conductors from the electric motor;

said connection pin having adjacent said one end a peripheral groove for retaining a sealing ring between said pin and said first holder;

said first insulated plate having another peripheral groove for retaining another sealing ring between said first insulated plate and said first upper plate, whereby liquid is prevented from entering the chamber formed by said first and second plate from said one end of said connection pin.

4,710,659

RESIN MOLDED ROTOR FOR A MAGNETO GENERATOR

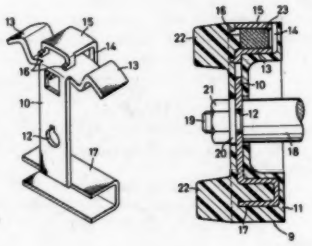
Masami Takano, and Yukio Tamura, both of Gunma, Japan, assignors to Sawafuji Electric Co., Inc., Tokyo, Japan

Filed Aug. 18, 1986, Ser. No. 897,263

Claims priority, application Japan, Aug. 28, 1985, 60-131353[U]

Int. Cl.[4] H02K *21/12*

U.S. Cl. 310—153 **10 Claims**



1. A resin molded rotor for a magneto generator comprising:

a magnet for generating electric power;

a metal core made of a ferromagnetic substance for supporting the mechanical strength;

a holding means formed on said metal core for holding said magnet;

a first pole portion integrally formed with said metal core, said first pole portion being formed on and extended from a first receiving portion of said holding portion where one pole of said magnet is received;

a second pole portion integrally formed with said metal core, said second portion being formed on and extended from a second receiving portion of said holding means where another pole of said magnet is received;

a pair of bridges formed with said metal core and arranged side-by-side for connecting said first receiving portion with said second receiving portion, said bridges being narrowly dimensioned such that they will be immediately saturated by magnetic flux thereby prohibiting any additional magnetic flux from entering said bridges; and

a molded resin disk connected to said metal core by insert molding to give the rotor a circular shape.

4,710,660

SOLENOIDAL HOMOPOLAR GENERATOR

Bobby D. McKee; Michael P. Cain, both of San Jose; Robert M. Delvecchio, Sunnyvale, and Emmanuel Aivaliotis, San Jose, all of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1986, Ser. No. 912,736

Int. Cl.[4] H02K *31/00*

U.S. Cl. 310—178 **7 Claims**

1. A dynamoelectric machine comprising:

a stator structure;

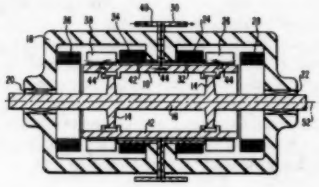
a rotor having a central axis, being positioned within said stator structure and being mounted for rotation with respect to said stator structure;

a first inner field coil supported by said stator structure and positioned around a first portion of said rotor;

a first outer field coil supported by said stator structure, concentric with said rotor axis and longitudinally spaced from said first inner field coil;

said first inner and outer field coils being wound to produce solenoidal magnetic flux in the same direction; and

a current collecting brush assembly for conducting current with a circumferential component to produce solenoidal magnetic flux in the same direction as magnetic flux produced by said first inner and outer field coils, said current



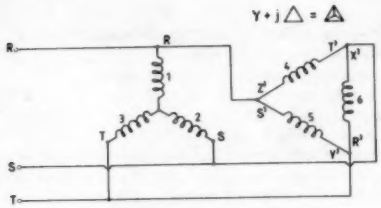
collecting brush assembly including a plurality of brush boxes each connected at one end to a cylindrical conductor, each lying at an inclined angle with respect to the axis of said rotor and each being generally positioned between said first inner and outer field coils in a longitudinal direction.

4,710,661

WINDING ARRANGEMENT OF A STATOR AND/OR ROTOR OF A THREE-PHASE GENERATOR OR ELECTROMOTOR WITH IMPROVED PERFORMANCES

Rifat Gjota, Titogradska 19, YU-38300 Pe , Yugoslavia

Filed Dec. 22, 1986, Ser. No. 944,063
Int. Cl.[4] H02K *3/00*
U.S. Cl. 310—198 **2 Claims**



1. Winding arrangement of a stator and/or rotor of a three-phase generator or electromotor with improved performances, characterized in that into the stator and/or rotor of a generator or electromotor there are installed star-connected and delta-connected windings that are mutually shifted in the space for an angle of $(\pi/2p)\pm(\pi/6p)$, p being the number of pole pairs.

4,710,662

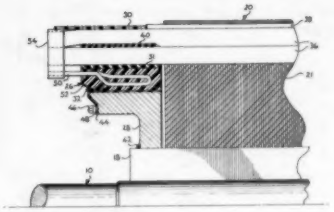
DYNAMOELECTRIC MACHINE ROTOR STRUCTURE HAVING IMPROVED INSULATION

Roy L. Balke; Charles H. Merrifield, and Frank E. Mizikowski, all of Erie, Pa., assignors to General Electric Company, Salem, Va.

Filed Dec. 9, 1985, Ser. No. 807,046
Int. Cl.[4] H02K *3/38, 3/50*
U.S. Cl. 310—204 **16 Claims**

10. In a dynamoelectric machine rotor structure of the type including a centrally extending shaft, main windings supported by said shaft, a winding support supported by said shaft and an encapsulated equalizer winding assembly disposed around said winding support contiguously to one end of said main windings, the improvenent comprising:

(a) an expansion member positioned between at least a portion of the winding support and the encapsulated equalizer winding assembly; and,



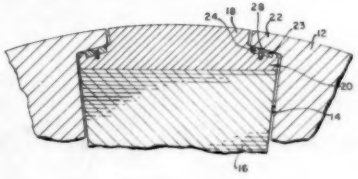
(b) an insulating resin covering at least exposed proximate portions of said winding support, said expansion member and said encapsulated equalizer winding assembly.

4,710,663

DYNAMOELECTRIC MACHINE COIL SLOT WEDGE MOUNTING ARRANGEMENT

Stephen R. Reid, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 12, 1986, Ser. No. 941,250
Int. Cl.[4] H02K *3/48*
U.S. Cl. 310—214 **8 Claims**



1. A dynamoelectric machine rotor comprising an armature having circumferentially spaced rotor teeth with coil slots formed between adjacent teeth and coils disposed in said coil slots, said teeth having projections formed at their radially outer ends and projecting toward one another into the adjacent coil slots, and coil wedges disposed in said coil slots between adjacent teeth, and having shoulder portions engaging said tooth projections to be supported thereby, said coil wedges having a self-lubricating material structure disposed on their shoulder portions in engagement with said tooth projections.

4,710,664

SPACE BLOCK CONTROL MEANS FOR DYNAMOELECTRIC MACHINE

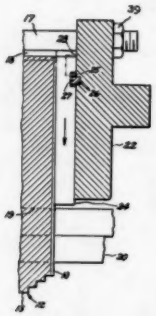
Frederick E. Cox, Gloversville; Frederick J. Rink, Jr., and Richard A. Valachovic, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 1, 1986, Ser. No. 881,157
Int. Cl.[4] H02K *1/18*
U.S. Cl. 310—217 **12 Claims**

1. In a stator core structure of a dynamoelectric machine wherein the core structure comprises an axially stacked array of laminations which form, in assembled relationship, a laminated core structure, and wherein the core structure is retained in its assembled relationship by one of a pair of flanges disposed at each end of the core, and retaining means coupled to said pair of flanges for maintaining clamping forces on the core structure in its assembled relationship, and wherein a space block is inserted between at least one of the flanges and the core structure in abutting surface relationship with the flange for distributing clamping forces imposed on the core structure

between said flanges, the improvement which comprises in combination:

each abutting surface of said flange and said space block having a mutually registrable groove disposed therein for forming a keyway between said flange and said space block;



a key member disposable in said keyway and having a width less than the width of the groove of the space block, whereby when the key member is disposed in the keyway there is excess space between the key member and a sidewall of the groove of the space block; and

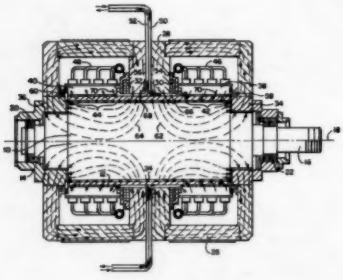
tab means disposed in the groove of the space block for occupying at least a portion of said excess space thereby limiting relative motion between said abutting surfaces.

4,710,665

HOMOPOLAR DYNAMOELECTRIC MACHINE WITH SELF-COMPENSATING CURRENT COLLECTOR

Lee A. Kilgore, Export, Pa., and Bobby D. McKee, San Jose, Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1986, Ser. No. 912,733
Int. Cl.[4] H02K *13/00*
U.S. Cl. 310—219 **4 Claims**



1. A dynamoelectric machine comprising:

a stator structure;

a rotor having a central axis, being positioned within said stator structure and being mounted for rotation with respect to said stator structure;

said stator structure having a flux path with a pole piece mounted to direct flux radially into a first portion of said rotor;

an excitation coil for producing magnetic flux in said flux path;

a generally cylindrical stator conductor positioned around said rotor to form an annular gap between said rotor and said stator conductor;

a current collecting means capable of making electrical contact with a second portion of said rotor and connected to conduct current from said rotor to one end of said stator conductor; and

a plurality of slits in said stator conductor, said slits being skewed at a preselected angle with respect to the rotor axis in a circumferential direction, so that current flowing in said stator conductor between said slits has a circumferential component which adds flux to the magnetic flux produced by said excitation coil;

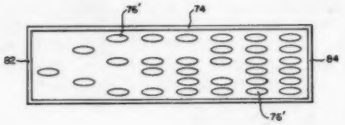
wherein said current collecting means includes a plurality of generally rectangular brush assemblies, each of said generally rectangular brush assemblies being inclined at a second angle with respect to said rotor axis in a circumferential direction, so that current flowing in said assemblies has a circumferential component which adds flux to the magnetic flux produced by said excitation coil.

4,710,666

HOMOPOLAR GENERATOR WITH VARIABLE PACKING FACTOR BRUSHES

Roald A. Rindal, Roseville, and Bobby D. McKee, San Jose, both of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1986, Ser. No. 912,737
Int. Cl.[4] H02K *13/00*
U.S. Cl. 310—248 **5 Claims**



1. A homopolar dynamoelectric machine comprising:

a rotor having a central axis;

an annular field coil encircling said rotor;

a stator structure supporting said field coil for directing magnetic flux produced by current flowing in said field coil, into a first section of said rotor;

means for rotating said rotor with respect to said stator;

a brush assembly including a plurality of contact elements which are capable of making sliding electrical contact with a second section of said rotor and extending longitudinally adjacent to said second rotor section; and

wherein said plurality of contact elements are packed with an increasing density in a longitudinal direction parallel to said central axis, such that the number of said contact elements capable of making sliding electrical contact with said rotor increases in said longitudinal direction.

4,710,667

BRUSHLESS D.C. DYNAMOELECTRIC MACHINE WITH DECREASED MAGNITUDE OF PULSATIONS OF AIR GAP FLUX

Eric Whiteley, Peterborough, Canada, assignor to Maghemite Inc., Mississauga, Canada

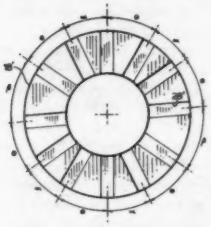
Continuation-in-part of Ser. No. 703,388, Feb. 20, 1985, Pat. No. 4,605,874. This application Aug. 11, 1986, Ser. No. 895,673
Claims priority, application United Kingdom, Jun. 12, 1984, 8414953
The portion of the term of this patent subsequent to Aug. 12, 2003, has been disclaimed.
Int. Cl.[4] H02K *21/14, 1/16*
U.S. Cl. 310—268 **12 Claims**

1. In a brushless D.C. dynamoelectric machine, which comprises:

a disc-like rotor element comprising hard ferrite toroid

means providing a plurality of magnetic poles of alternating polarity and mounted for rotation about its axis,

a disc-like stator element comprising soft ferrite toroid means and mounted coaxially with and spaced apart from the rotor element to define an air gap therebetween, said



soft ferrite toroid means being formed with radially-directed coil winding-receiving slots, and

electrical coil windings mounted to said stator in said slots, the improvement which comprises means for decreasing the magnitude of pulsations of air gap flux during rotation of said rotor with respect to said stator.

4,710,668

VIBRATING STRING RESONATOR

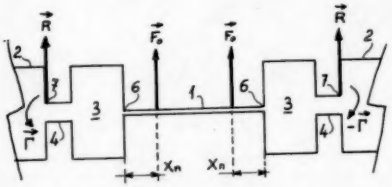
Henri Fima, Malissard, and Denis Janiaud, Les Ulis, both of France, assignors to Crouzet, Paris and Office National d'Etudes et de Recherche Aerospatiales (O.N.E.R.A.), Chatillon, both of, France

Filed Dec. 2, 1985, Ser. No. 803,160

Claims priority, application France, Dec. 4, 1984, 84 18587

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—323 **11 Claims**



1. A resonator, comprising:

a beam capable of vibrating under flexion;

a pair of fixing means for fixing said beam at both of its ends;

a pair of inertia mass means disposed between said beam and respective ones of said fixing means for providing a vibratory decoupling between said beam and said pair of fixing means;

a pair of flexible articulation means disposed between and interconnecting respective ones of said inertia mass means and said fixing means;

a pair of flexible articulation means disposed between and interconnecting respective ones of said inertia mass means and said fixing means;

each inertia mass means being mounted to oscillate in a vibration plane in which said beam vibrates and to pivot about a pivot axis orthogonal to said vibration plane, said pivot axis being situated at one of said flexible articulation means;

each inertia mass being rigid, compact and having a convex contour and being connected at its face opposite to said beam to one of said flexible articulation means;

each inertia mass means being driven to rotate only about said pivot axis in response to vibration of said beam; and

the pair of inertia mass means having predetermined sizes to yield in said vibration plane a substantially zero resulting force applied to said pair of fixing means by said beam, said pair of inertia mass means and said pair of flexible articulation means.

4,710,669

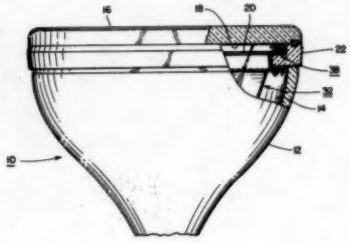
INTERNAL ELECTRICAL CONNECTOR FOR A TENSION MASK TUBE

Alfred Adamski, Elmhurst; Thomas P. DeFranco, Norridge, and Lawrence W. Dougherty, Sleepy Hollow, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 19, 1985, Ser. No. 811,051

Int. Cl.[4] H01J *29/07, 29/92*

U.S. Cl. 313—402 **6 Claims**



1. In a CRT comprising a funnel having a conductive coating applied to a selected area of its internal wall, a faceplate having a luminescent screen deposited upon its display surface, a ring formed of a non-conductive material and interposed between said funnel and said faceplate for supporting a tension color selection electrode in registration with said screen, an improved unitary connector arrangement for establishing said funnel coating, said screen, and said color selection electrode at a common electrical potential, said connector arrangement comprising:

a clip formed of a resilient conductive material and configured to be retained upon said ring;

first contact means supported by said clip for effecting a conductive engagement between said screen and said clip;

second contact means, also supported by said clip, for effecting a conductive engagement between said funnel coating and said clip; and

means for effecting an electrical connection between said clip and said color selection electrode,

whereby said screen, said funnel coating and said color selection electrode are established at a common electrical potential by said unitary connector arrangement.

4,710,670

FRONT ASSEMBLY SYSTEM FOR A TENSION MASK COLOR CATHODE RAY TUBE

Lawrence W. Dougherty, Sleepy Hollow, and James R. Fendley, Arlington Heights, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Feb. 21, 1986, Ser. No. 832,559

Int. Cl.[4] H01J *29/07, 29/02*

U.S. Cl. 313—407 **4 Claims**

1. A front assembly system for a color cathode ray tube having an improved internal electrical interconnection system comprising:

a substantially flat faceplate having on its inner surface a centrally disposed target area on which is disposed at least one pattern of phosphor deposits;

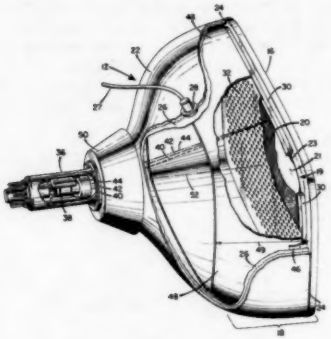
a funnel attached to a peripheral sealing area on said inner surface of said faceplate, and having an internal electrically conductive funnel coating adapted to receive a high electrical potential;

an electrically conductive frame attached to said inner sur-

face between said target area and said peripheral sealing area and enclosing said target area, said frame supporting in electrical union therewith a tensed metallic foil shadow mask;

an electrically conductive screen disposed on said pattern of phosphor deposits and electrically interconnected to said frame;

electrical interconnecting means for providing an electrical



connection between said frame and said internal electrically conductive funnel coating;

whereby a high-voltage conduit is formed between said internal funnel coating and said mask through said frame, said electrically conductive frame multi-functionally serving to mechanically support said interconnecting means and said mask, and to electrically interconnect said conductive funnel coating, said conductive screen film, and said mask.

4,710,671

COLOR TELEVISION DISPLAY TUBE WITH COMA CORRECTION

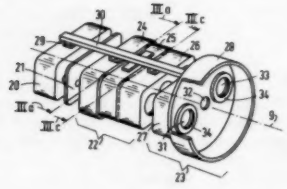
Albertus A. S. Sluyterman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 10, 1986, Ser. No. 872,771

Claims priority, application Netherlands, Jun. 12, 1985, 8501687; Oct. 9, 1985, 8502746

Int. Cl.[4] H01J *29/51, 29/76*

U.S. Cl. 313—413 **9 Claims**



1. A color display tube comprising an envelope containing a display screen, and an electron gun system for producing a central electron beam and first and second outer electron beams having respective axes which lie in a single plane and converge toward a point on the screen, the electron gun system including an end from which the electron beams exit into a deflection field region of the envelope where a field deflection field effects deflection of the beams in a direction perpendicular to said plane and a line deflection field effects deflection of the beams in a direction parallel to said plane, said line deflection field producing a positive lens action;

characterized in that the electron gun system includes field coma-correcting means comprising:

(a) first and second deflection field shaping means of magnetically-permeable material arranged adjacent the respective outer electron beams, at the end of the electron gun system, for cooperating with the positive lens action of the line deflection field to anisotropically overcorrect the field coma error of said outer electron beams relative to that of the central electron beam; and

(b) a third deflection field shaping means of magnetically-permeable material arranged adjacent the central electron beam, at a position in the electron gun system further from the screen than the first and second field shaping means, for cooperating with the positive lens action of the line deflection field to reverse-anisotropically correct the field coma error of the central electron beam by an amount sufficient to compensate for the overcorrection by the first and second field shaping means, thereby effecting production of a central-electron-beam- produced raster which is substantially identical to the outer-electron-beam-produced rasters.

4,710,672

PICTURE DISPLAY DEVICE

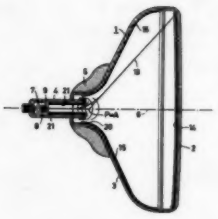
Maurits W. Van Tol, Almelo, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 1, 1982, Ser. No. 353,315

Claims priority, application Netherlands, Apr. 16, 1981, 8101888

Int. Cl.[4] H01J *29/54, 29/74*

U.S. Cl. 313—413 **5 Claims**



1. A cathode ray tube comprising an evacuated envelope containing an electron gun, centered on an electron optical axis of the tube, and further comprising deflection coil means mounted on the envelope for effecting deflection of an electron beam produced by the electron gun to paths along lines intersecting a deflection point on the axis,

characterized in that the electron gun includes a plurality of electrodes positioned along the axis to effect formation of an accelerating electrostatic lens system comprising, in the direction of propagation of the electron beam, a positive lens followed by a negative lens, said deflection point being centrally located between opposing faces of said lenses.

4,710,673

ELECTRON TUBE ENVELOPE ASSEMBLY WITH PRECISELY POSITIONED WINDOW

Gerardus A. H. M. Vrijssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 544,765, Oct. 24, 1983, abandoned. This application Jun. 25, 1986, Ser. No. 880,941

Claims priority, application Netherlands, Nov. 2, 1982, 8204238

Int. Cl.[4] H01J *31/00;* **C03C** *27/02*

U.S. Cl. 313—477 R **1 Claim**

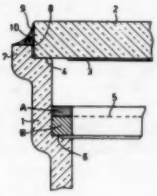
1. An electron tube envelope assembly comprising:

a tubular envelope having a first end and an axis, said enve-

lope having a bearing surface at the first end, the bearing surface being perpendicular to the axis;

a window having a radiation-sensitive layer thereon, said window directly contacting the bearing surface of the envelope to form a seam along the junction between the window and the bearing surface; and

means for hermetically sealing the seam;



wherein the hermetic sealing means comprises:

a mass of indium solder or an indium alloy solder provided outside the seam and along the circumference of the seam; and

a metal wire embedded in the solder, said metal wire capable of being soldered with indium or an indium alloy.

4,710,674

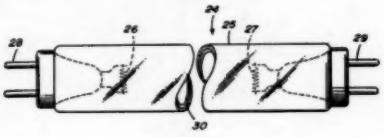
PHOSPHOR PARTICLE, FLUORESCENT LAMP, AND MANUFACTURING METHOD

A. Gary Sigai, Lexington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 607,865, May 7, 1984, abandoned, and a continuation-in-part of Ser. No. 607,846, May 7, 1984, abandoned. This application Apr. 3, 1985, Ser. No. 718,095

Int. Cl.[4] H01J *1/70, 61/35*

U.S. Cl. 313—489 **19 Claims**



1. A method for improving lumen maintenance of fluroescent lamps comprising the steps of

(a) depositing a continuous aluminum oxide coating on individual particles of a finely-divided fluroescent lamp phosphor to form idividually coated phosphor particles, each phosphor particle being surrounded by a nonparticulate aluminum oxide coating of a conformal nature:

(b) applying one or more layers of phosphor to a fluroescent lamp envelope to form a phosphor coated envelope, at least one of the phosphor layers having a phosphor component comprising said individually coated phosphor particles;

(c) processing said phosphor coated envelope into a finished lamp.

4,710,675

SOLID DYNODE STRUCTURE FOR PHOTOMULTIPLIER

Kenneth E. Stephenson, Pennington, N.J., assignor to Sangamo Weston, Inc., Norcross, Ga.

Filed Apr. 29, 1985, Ser. No. 728,135

Int. Cl.[4] H01J *43/06, 43/22*

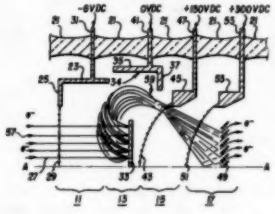
U.S. Cl. 313—532 **10 Claims**

1. In an electron multiplier of the type including a source of electrons and means for collecting electrons multiplied by the electron multiplier spaced apart from the electron source along a longitudinal axis of the electron multiplier, an improved dynode and electron guiding structure, comprising:

a solid dynode formed from a disk of electrically conductive material exhibiting secondary electron emission arranged between the electron source and the electron collecting means, the dynode having a surface oriented in a plane substantially perpendicular to the longitudinal axis of the electron multiplier;

a first guide electrode formed from a cylindrical ring of electrically conductive material and arranged symmetrically about the longitudinal axis of the electron multiplier between the dynode and the electron source, the electrode including an annular flange formed along a portion of the ring remote from the dynode and toward the electron source and directed radially inward toward the longitudinal axis of the electron multiplier to define an opening therein, with the flange being oriented in a plane substantially perpendicular to the longitudinal axis of the electron multiplier;

a second guide electrode formed from an annular ring of electrically conductive material and arranged symmetrically about the dynode, the second electrode including an



annular flange formed along a portion of the ring remote from the dynode and on the side opposite to the dynode from the first electrode and directed radially inward toward the longitudinal axis of the electron multiplier to define an opening therein, with the flange being oriented in a plane substantially perpendicular to the longitudinal axis of the electron multiplier; and

an electrically conductive grid disposed between the dynode and the electron collecting means,

whereby when the dynode and the second guide electrode are placed at the same electrical potential, and an electrical potential is applied to the first guide electrode which is slightly negative with respect to the potential applied to the dynode, and an electrical potential is applied to the grid which is more positive than that applied to the dynode and second guide electrode, the first and second guide electrodes cooperate together to cause substantially all secondary electrons emitted from the surface of the dynode, due to impacts from the electrons from the electron source, to be guided away from the first guide electrode and between the dynode and the second guide electrode and through the grid and focused at an area containing the electron collector.

4,710,676

MULTI-LEVEL FUSER LAMP

Merle E. Morris; Lawrence M. Rice, both of Lexington, and Steven L. Meade, Winchester, all of Ky., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 765,975, Aug. 15, 1985, abandoned. This application Jun. 25, 1987, Ser. No. 67,405

Int. Cl.[4] H01K *9/00, 1/18*

U.S. Cl. 313—579 **13 Claims**

1. A tungsten-halogen, incandescent heating lamp for use in a photocopier, said lamp comprising;

a tubular quartz envelope having first and second press sealed end portions;

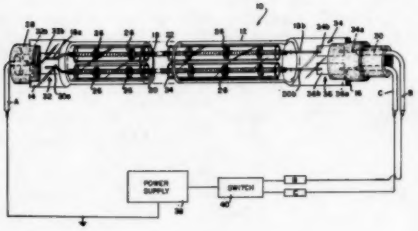
first and second coiled tungsten filaments extending longitudinally through the interior of said tubular envelope;

a fill gas mixture disposed within said envelope;

first contact means associated with said first press sealed end portion and electrically coupled to a first end of each of said first and second filaments;

second contact means associated with said second press sealed end portion and electrically coupled to a second end of said first filament, said first filament being energized upon application of a predetermined voltage across said first and second contact means to provide a first level of heating energy from said lamp along a given length of said lamp;

third contact means associated with said second press sealed end portion and electrically coupled to a second end of said second filament, said second filament being energized upon application of a predetermined voltage across said



first and third contact means to provide a second level of heating energy from said lamp along said same given length of said lamp, said second level of heating energy different from said first level of said heating energy; and

means for electrically isolating said first and second filaments, said isolating means disposed within and extending longitudinally through the interior of said envelope, said lamp providing a third level of heating energy from said lamp along said same given length of said lamp substantially equal to the total of said first and second levels of heating energy upon simultaneous application of a predetermined voltage across said first and second contact means and across said first and third contact means, said lamp thereby providing three different levels of heating energy along said same given length of said lamp and per square centimeter of paper heated by said lamp within said photocopier, said isolating means comprised of electrically insulative material and including at least one quartz tube disposed within said coiled tungsten filaments therein.

4,710,677

INCANDESCENT LAMPS

Alex L. Halberstadt, London, and Roger A. Hume, Melton Mowbray, both of England, assignors to Thorn Emi plc, London, England

Filed Aug. 2, 1984, Ser. No. 636,990

Claims priority, application United Kingdom, Aug. 2, 1983, 8320639

Int. Cl.[4] H01K *1/26*

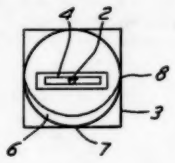
U.S. Cl. 313—580 **6 Claims**

1. An incandescent lamp comprising:

an envelope having an exterior surface and being formed from a material having a substantially high silica content;

a filament enclosed within said envelope; and

a coating reflective of radiation emitted by said filament and consisting of a layer of a substantially pure metallic oxide containing no binding agent, said layer having been applied whilst in a molten state to an area of said exterior surface, thereby causing said layer to be fused in a substantially permanent manner to said exterior surface without a binding agent, so that, when heated by radiation from said filament, said coating undergoes substantially no discolor-



ation, and wherein said coating possesses a variable thickness which is a maximum in a central region of said area of said exterior surface and a minimum in a peripheral region of said area.

4,710,678

ELECTRODELESS LOW-PRESSURE DISCHARGE LAMP

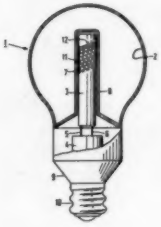
Henk Houkes; Pieter Postma, and Andreas C. Van Veghel, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 22, 1985, Ser. No. 725,441

Claims priority, application Netherlands, Apr. 24, 1984, 8401307

Int. Cl.[4] H05B *41/16, 41/24*

U.S. Cl. 315—39 **4 Claims**



1. An electrodeless low-pressure discharge lamp comprising:

a lamp vessel which is sealed in a vacuum-tight manner and contains a metal vapor and a rare gas;

a core of magnetic material;

a first winding coupled by a pair of lead-in wires to a high-frequency voltage supply, the winding being arranged about the core so that during operation of the lamp an electrical field is produced in the lamp vessel and an inductive potential drop is induced in said winding;

means for connecting high frequency voltage supply to electrical supply conductors;

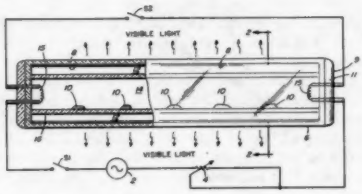
and the improvement comprising:

a second winding also arranged about the core, respective turns of the second winding being located adjacent successive turns of the first winding and electrically insulated therefrom, so that during operation a potential voltage is induced across ends of the second winding which is substantially equal and opposite said potential drop of the first winding; and one end of the second winding being electrically connected to one of the lead-in wires of the first winding, the other end of the second winding being free, said second winding being arranged such that parasitic capacitive coupling of interference currents to ground and said supply conductors is suppressed.

4,710,679
FLUORESCENT LIGHT SOURCE EXCITED BY EXCIMER EMISSION

A. Bowman Budinger, Westford, and Walter P. Lapatovich, Hudson, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Dec. 6, 1985, Ser. No. 806,048
Int. Cl.[4] H01J 7/44, 13/36, 17/78, 29/96; H01K 1/62
U.S. Cl. 315—58 12 Claims



1. A light source comprising:

(a) a visible light transparent outer envelope containing fluorescent means for emitting visible light radiation upon absorption of UV emission; and

(b) UV emission means for providing UV excimer emission within a separate inner envelope within said outer envelope for transmission through said separate inner envelope and absorption by said fluorescent means to produce visible illumination for passage through said outer envelope; said UV emission means comprising a metal halide and a buffer gas and an electrode means for creating an electrical discharge which excites the buffer gas and dissociates the metal halide and wherein molecules of said halide combine with molecules of the excited gas to produce an excimer, which upon decay, results in spontaneous emission of UV light.

4. A source of visible illumination comprising:

(a) ultraviolet emission means within a first envelope for generating spontaneous excimer ultraviolet emission from an electrical discharge between two electrodes in an enclosed atmosphere of metal halide vapors and an inert gas; and

(b) visible emission means in a second envelope about said first envelope responsive to said ultraviolet emission for generating visible light and wherein a ballast circuit is coupled across said electrodes for providing a current flow through said electrodes to emit sufficient electrons to cause an electrical discharge through a buffer gas, bringing the buffer gas molecule to its excited state and heating an inner chamber to cause the metal halide to form metal halide vapors and wherein the metal halide is dissociated, and halide molecules combine with the excited state buffer gas molecules whereupon spontaneous excimer radiation at UV wavelength occurs.

4,710,680
DRIVER DEVICE MOUNTING FOR A FLAT MATRIX DISPLAY PANEL

Hiroshi Nakatani, Tenri; Hirokazu Yoshida, Osaka, and Keiji Yamamura, Takaichi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 640,563, Aug. 14, 1984, abandoned.
This application Mar. 24, 1987, Ser. No. 30,256
Claims priority, application Japan, Aug. 24, 1983, 58-155279
Int. Cl.[4] G09G 3/10
U.S. Cl. 315—169.4 2 Claims

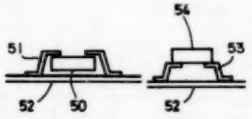
1. A flat matrix display panel system comprising:

a flat matrix display panel including a plurality of X-electrodes and a plurality of Y-electrodes, said plurality of Y-electrodes being divided into first and second groups having first terminals formed along a first edge of said flat matrix display panel and second terminals formed along a second opposing edge of said display panel respectively;

a circuit substrate;

an X-electrode driver LSI mounted on a first major surface of said circuit substrate;

a first Y-electrode driver LSI mounted on said first major surface of said circuit substrate by a face-up bonding of a tape automated bonding technique, said first Y-electrode



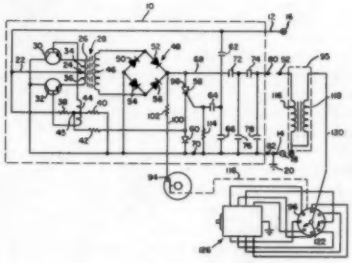
driver LSI being connected to said first terminals formed along said first edge of said flat matrix display panel; and

a second Y-electrode driver LSI mounted on said first major surface of said circuit substrate by a face-down bonding of the tape automated bonding technique, said second Y-electrode driver LSI being connected to said second terminals formed along said second opposing edge of said flat matrix display panel.

4,710,681
PROCESS FOR BURNING A CARBONACEOUS FUEL USING A HIGH-ENERGY ALTERNATING CURRENT WAVE

Aleksandar Zivkovich, 93 Stuyvesant Rd., Pittsford, N.Y. 14534

Filed Feb. 18, 1986, Ser. No. 829,972
Int. Cl.[4] F02P 3/04, 15/08
U.S. Cl. 315—209 T 8 Claims



2. In an electronic ignition circuit for applying a high-frequency, high-voltage wave to a spark gap of a spark ignition device in a combustion chamber into which a combustible fuel is introduced and including a.c. means for providing an alternating current high-voltage, high-frequency wave, and switching means coupled to said a.c. means for providing said wave during ignition intervals, and in which said a.c. means includes a d.c.-d.c. converter that is formed of a step-up transformer having a center tap primary, and a secondary, a pair of transistors coupled in push-pull between said primary and a battery potential, with a center tap of the primary being connected to a complementary battery potential, and with said transistors having control electrodes, feedback means coupled to said control electrodes and supplying a feedback signal thereto so that said primary receives oscillations of current through said transistors, and rectifier means coupled to said secondary to produce a high voltage d.c. current, and further including a chopper circuit connected to said rectifier means for producing a high voltage a.c. current; the improvement in which said chopper circuit produces said high voltage a.c. current at a substantially constant predetermined frequency, and includes a trigger circuit coupled to said feedback means and to said pair of push-pull transistors to switch the chopper circuit on and off

at said predetermined frequency with oscillations of said transformer primary such that the output wave has a peak voltage of 25,000 to to 200,000 volts and at said predetermined frequency in the range of 8 KHz to 80 KHz; and said switching means is coupled to control the voltage of the chopper circuit so that during said ignition intervals said a.c. wave is provided at the wave peak voltage sufficient to arc across said gap, and during the intervals between successive said ignition intervals said wave is provided at a finite peak voltage insufficient to arc across said gap, but maintaining said substantially constant predetermined frequency during such intervals.

4,710,682

FLUORESCENT LAMP OPERATING CIRCUIT

Anton Zachtriegel, Taufkirchen, Fed. Rep. of Germany, assignor to Patent-Treuhand-Gesellschaft fur elektrische Gluhlampen m.b.H., Munich, Fed. Rep. of Germany

Filed Mar. 9, 1987, Ser. No. 23,456

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1986, 3608615

Int. Cl.[4] H05B *37/00*

U.S. Cl. 315—224 **6 Claims**

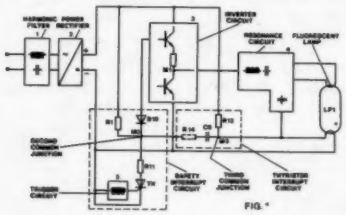


FIG. 1

1. Automatically restarting operating circuit for a low-pressure discharge lamp, such as a fluorescent lamp, for operation of the lamp with alternating current at a frequency high with respect to the frequency of a power network, having

a power rectifier (2) adapted for connection to the power network;

a push-pull inverter circuit (3), connected to the rectifier (2) and including

serially connected, alternately switching transistors (T1, T2) having a common junction (M1), and connected across the power rectifier (2), and

a control circuit for alternately controlling the transistors to conduct or block;

a series resonance circuit (4) associated with the low-pressure lamp (LP1, LP2) including

a resonance inductance (L3.1, L4.1), and

a coupling capacitor (C4, C10) and a resonance capacitor (C5, C11);

a connection network interconnecting the series resonance circuit and the low-pressure lamp including

a connection circuit connecting a first electrode (E1, E3) of the lamp to the coupling capacitor (C4, C10) and the resonance inductance (L3.1, L4.1) with the common junction (M1) of the switching transistors (T1, T2);

a second connection circuit connecting the second electrode (E2, E4) of the lamp with the negative terminal of the power rectifier (2); and

a safety interrupt circuit to remove the current from the electrode terminals of the lamp upon failure or removal of the lamp including

a series bypass circuit having a diode (D10) and a resistor (R11), said diode and resistor forming a second common junction (M2) and a main current path of a thyristor (TH) connected to the base of that one switching transistor (T1) which is connected to the positive terminal of the power rectifier (2), and the negative terminal of the power rectifier (2),

a trigger control circuit (5) for the thyristor (TH) and connected to the gate of the thyristor, and

a holding circuit including a holding resistor (R1) coupled to the positive terminal of the power rectifier (2) and said second common junction (M2) between the control circuit resistor (R11) and the control circuit diode (D10),

and comprising, in accordance with the invention,

a circuit to interrupt conduction of the thyristor (TH) after firing thereof due to the removal of the holding current from the thyristor, including

a thyristor, disconnect capacitor (C9, C12) and a disconnect resistor (R12, R13), said disconnect capacitor and resistor having a third common junction (M3);

the thyristor disconnect capacitor (C9, C12) having a free terminal connected to said second common junction (M2) between the series circuit diode (D10) and series circuit resistor (R11) of the thyristor disconnect circuit;

the disconnect resistor (R12, R13) having the free terminal connected to the positive terminal of the power rectifier (2);

and said third common junction (M3) between the thyristor disconnect capacitor (C9, C12) and the thyristor disconnect resistor (R12, R13) being connected to one of the heater electrode terminals (A3, A7) of that one of the electrodes (E2, E4) of the lamp (LP1, LP2) which has its other terminal (A4, A8) directly connected to the negative terminal of the power rectifier (2),

to discharge, and recharge in opposite direction of the thyristor disconnect capacitor (C9, C12) upon reinsertion of a lamp (LP1, LP2) in the circuit and thereby withdraw holding current from the disconnect thyristor (TH) and permit the alternating switching transistors (T1, T2) to resume oscillation.

4,710,683

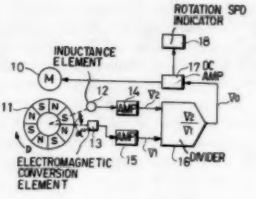
ROTATION DETECTING APPARATUS

Itsuki Bahn, and Hideo Okada, both of Tokyo, Japan, assignors to Secoh Geiken Inc., Tokyo, Japan

Continuation of Ser. No. 805,256, Dec. 5, 1985, abandoned, which is a continuation of Ser. No. 418,994, Sep. 16, 1982, abandoned. This application Feb. 24, 1987, Ser. No. 18,724

Int. Cl.[4] H02K *29/00*

U.S. Cl. 318—254 **11 Claims**



1. A rotational detecting apparatus for producing an output proportional to rotational speed of a rotary machine having a rotary shaft, comprising:

a magnetic means, having a plurality of magnetic poles, arranged to rotate along with said shaft of said rotary machine so as to provide a rotating magnetic field flux density of which varies at fixed points in time relation to said rotational speed;

a first means, fixedly disposed in said rotating magnetic field, comprising electromagnetic conversion means including at least one Hall element operating on the Hall principle to provide a first output voltage the amplitude of which is a function only of magnetic flux density of said rotating magnetic field;

a second means, fixedly disposed in said rotating magnetic field, comprising an inductance means operating by elec-

tromagnetic induction to provide a second output voltage the amplitude of which is a function of both flux density of said magnetic field and its rotational speed; and

electric circuit means for receiving said first and second output voltages and producing as an output a third output voltage corresponding to a quotient of the value of said second output voltage divided by the value of said first output voltage, said third output voltage being directly proportional to said rotational speed of said rotating magnetic field and independent of its flux density.

4,710,684

DRIVE CIRCUIT FOR BRUSHLESS DC MOTORS

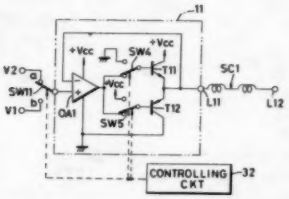
Masaya Okita, Yokohama; Masshiro Sawada, and Tadashi Ota, both of Tokyo, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 12, 1984, Ser. No. 660,503

Claims priority, application Japan, Oct. 14, 1983, 58-190862

Int. Cl.[4] H02P *6/02*

U.S. Cl. 318—254 **10 Claims**



1. A drive circuit for a brushless DC motor for controlling the flow of current between terminals of each stator coil of said motor, said drive circuit including voltage application means provided for each of said stator coils so as to apply a voltage across the terminals thereof, said voltage application means comprising:

(a) a first complementary symmetry circuit having an input terminal and an output terminal, said output terminal being connected to one of the terminals of said stator coil, said first complementary symmetry circuit including first and second transistors having different polarities, means for connecting a base of said first transistor with a base of said second transistor and means for connecting an emitter of said first transistor with an emitter of said second transistor,

(b) a second complementary symmetry circuit having an input terminal and an output terminal connected to the other terminal of said stator coil, said second complementary symmetry circuit including third and fourth transistors having different polarities, means for connecting a base of said third transistor with a base of said fourth transistor and means for connecting an emitter of said third transistor and an emitter of said fourth transistor,

(c) switch means for turning off all the transistors in said first and second complementary symmetry circuits,

(d) a first operational amplifier having an inverting input terminal, a noninverting input terminal and an output terminal connected to the input terminal of said first complementary symmetry circuit,

(e) means forming a negative feedback loop between said first operational amplifier and said first complementary symmetry circuit,

(f) first control means for controlling the potential at the noninverting input terminal of said first operational amplifier,

(g) a second operational amplifier having an inverting input terminal, a noninverting input terminal and an output terminal connected to the input terminal of said second complementary symmetry circuit,

(h) means forming a negative feedback loop between said second operational amplifier and said second complementary symmetry circuit, and

(i) second control means for controlling the potential at the noninverting input terminal of said second operational amplifier,

wherein said switch means includes means for maintaining the input terminals of said first and second complementary symmetry circuits at the same potential.

9. A drive circuit for a brushless DC motor for controlling the flow of current between terminals of each stator coil of said motor, said drive circuit including voltage application means provided for each of said stator coils so as to apply a voltage across the terminals thereof, said voltage application means comprising:

(a) a first complementary symmetry circuit having an input terminal and an output terminal, said output terminal being connected to one of the terminals of said stator coil, said first complementary symmetry circuit including first and second transistors having different polarities means for connecting a base of said first transistor with a base of said second transistor and means for connecting an emitter of said first transistor with an emitter of said second transistor;

(b) a second complementary symmetry circuit having an input terminal and an output terminal connected to the other terminal of said stator coil, said second complementary symmetry circuit including third and fourth transistors having different polarities, means for connecting a base of said third transistor with a base of said fourth transistor and means for connecting an emitter of said third transistor with an emitter of said fourth transistor;

(c) switch means for turning off all the transistors in said first and second complementary symmetry circuits said switch means having first means and second means, said first means disconnecting the bases of said first and second transistors, causing the potential of the base of said first transistor to become substantially equal to the potential of the collector of said second transistor and causing the potential of the base of said second transistor to become substantially equal to the potential of the collector of said first transistor, said second means disconnecting the bases of said third and fourth transistors, causing the potential of the base of said third transistor to become substantially equal to the potential of the collector of said fourth transistor and causing the potential of the base of said fourth transistor to become substantially equal to the potential of the collector of said third transistor;

(d) a first operational amplifier having an inverting input terminal, a noninverting input terminal and an output terminal connected to the input terminal of said first complementary symmetry circuit;

(e) means for forming a negative feedback loop between said first operational amplifier and said first complementary symmetry circuit;

(f) first control means for controlling the potential at the noninverting input terminal of said first operational amplifier;

(g) a second operational amplifier having an inverting input terminal, a noninverting input terminal and an output terminal connected to the input terminal of said second complementary symmetry circuit;

(h) means for forming a negative feedback loop between said second operational amplifier and said second complementary symmetry circuit; and

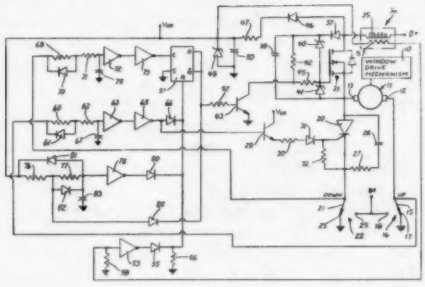
(i) second control means for controlling the potential at the noninverting input terminal of said second operational amplifier.

4,710,685

VEHICLE POWER WINDOW CONTROL CIRCUIT WITH REVERSE BATTERY PROTECTION

Richard N. Lehnhoff, and Robert J. Disser, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 17, 1987, Ser. No. 15,321
Int. Cl.[4] H02P *1/22*; H02H *7/08*
U.S. Cl. 318—287 **3 Claims**



3. A power window control circuit for a motor vehicle comprising, in combination:

an electric power supply having power and ground terminals with a power supply voltage therebetween;

an electric motor having an armature with first and second armature terminals;

a FET having a drain connected to the power terminal and a source connected to the first armature terminal, the FET further having a gate and an internal anti-parallel diode;

an SCR connecting the first armature terminal to the ground terminal of the electric power supply;

a switch having first and second states connecting the second armature terminal to the power and ground terminals, respectively, the switch being normally in its second state;

a first diode having an anode connected to the FET drain and a cathode;

a capacitor connected from the cathode of the first diode to the FET source;

first and second resistors in series connected between the cathode of the first diode and the FET gate;

a transistor having a control electrode and further having an internal controlled current path connecting the junction of the first and second resistors to the ground terminal;

a first zener diode having a cathode connected to the cathode of the first diode and an anode connected to the FET gate, the first zener diode having a zener voltage greater than the power supply voltage but less, by at least the FET threshold voltage, than the maximum allowable FET source to drain voltage;

a second zener diode having a cathode connected to the FET gate, an anode connected to the FET source and a zener voltage less than the maximum allowable FET source to gate voltage;

first control means activatable to activate the SCR and change the switch to its first state, whereby the motor is activated to run in a first window moving direction, and deactivatable to return the switch to its second state, whereby the motor stops running, the SCR deactivates and the inductive energy of the motor armature is dissipated through the internal anti-parallel diode of the FET; and

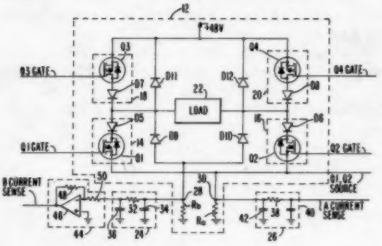
second control means connected to the transistor control electrode to cause conduction through the transistor and thus ground the FET gate, the second control means being activatable to end conduction through the transistor and thus allow the capacitor to activate the FET to conduct, whereby the motor is activated to run in a second window moving direction, and deactivatable to resume conduction through the transistor, whereby the FET stops conducting, the motor stops running, and the inductive energy of the motor armature is dissipated by the FET conducting due to the high voltage generated thereby across the FET and the first zener diode.

4,710,686

METHOD AND APPARATUS FOR CONTROL OF CURRENT IN A MOTOR WINDING

Nahum E. Guzik, Mt. View, Calif., assignor to Guzik Technical Enterprises, Sunnyvale, Calif.

Filed Aug. 4, 1986, Ser. No. 892,109
Int. Cl.[4] H02P *1/22*
U.S. Cl. 318—293 **10 Claims**



1. In a method for controlling the flow of current in an inductive load to cause the current to follow a certain command waveform having a rapidly decaying portion, comprising the steps of:

connecting the inductive load across a power supply for flow of current through the inductive load in a first direction;

connecting first and second current modulators in series with said inductive load and on opposite sides of said load, for modulating the flow of current through the inductive load;

connecting a first diode in parallel with the series connection of the inductive load and said second current modulator, and in reverse polarity to the first direction of current flow, for allowing the current to circulate through the inductive load and the second current modulator in the first direction when the current flow to the inductive load from the power supply is interrupted by said first current modulator;

connecting a second diode in parallel with the series connection of the inductive load and said first current modulator, and in reverse polarity to the first direction of the current flow, for allowing the current to circulate through the inductive load in the first direction, and through the power supply and the first diode in the opposite direction, when the current is interrupted by both said first and second current modulators, whereby the circulating current in said inductive load is caused to decay rapidly;

sensing the flow of current through said second current modulator;

sensing the flow of current through said first diode;

comparing the sensed currents with the command waveform to derive an error signal;

controlling said first current modulator in response to the error signal, derived from the comparison of the sensed current flow through said second current modulator so as to cause the modulating current to follow the command waveform;

sensing loss of current control when the first current modulator can no longer cause the current through the inductive load to decay rapidly enough to follow the decaying portion of the command waveform; and

cutting off the current flow through both of said first and second current modulators in response to sensing loss of

current control, to cause the current to circulate through the power supply in the opposite direction, and through the inductive load in the first direction, whereby the current in the inductive load in the first direction is caused to decay rapidly.

7. In a motor-drive circuit for causing the current in the motor winding to follow a certain command waveform having a rapidly decaying portion comprising

current supply means for supplying a flow of current in a first direction;

a motor winding connected across said current supply means for flow of current from said current supply means through said motor winding for driving said motor;

first and second current modulator means connected in series with said motor winding and on opposite side of said winding for modulating the flow of current through said winding;

a first diode means connected in parallel with the series connection of said motor winding and said second current modulator means, and in reverse polarity to said first direction of current flow, for allowing current to circulate through said motor winding and said second current modulator means in the first direction when the current flow to said motor winding from said power supply means is interrupted by said first current modulator means;

a second diode means connected in parallel with the series connection of said motor winding and said first current modulator means and in reverse polarity to the first direction of current flow for allowing the current to circulate through said motor winding in the first direction, and through said power supply means and said first diode means in the opposite direction, when the current is interrupted by both said first and second current modulator means, whereby the circulating current in said motor winding is caused to decay rapidly;

first sensing means for sensing the flow of current through said second current modulator means to derive a first sensed output;

comparator means for comparing said first sensed current output with the command waveform to derive a first error signal output;

said first current modulator means being responsive to said first error signai output, for causing the current flowing through said motor winding and said second current modulator means to follow the command waveform;

control sensing means including means for sensing loss of control over the current in said motor winding and means for producing a loss of control output when said first current modulator means can no longer cause the current through said motor winding, to decay rapidly enough to follow the rapidly decaying portion of the command waveform; and

said second current modulator means being responsive to said loss of control output, for modulating current flow therethrough and for causing current to circulate through said motor winding in the first direction, through said second diode, power supply means, and first diode means in the opposite direction, and to cause the circulating current in said motor winding to decay rapidly.

4,710,687
SEEK OPERATION CONTROL APPARATUS

Hiroyuki Kanda, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 29, 1986, Ser. No. 901,882
Claims priority, application Japan, Aug. 30, 1985, 60-191565
Int. Cl.[4] G05B *13/00*
U.S. Cl. 318—561 **12 Claims**

1. A seek operation control apparatus comprising:

readout means for reading out data recorded on a disk that indicates a track position, and for outputting position data corresponding to the readout data;

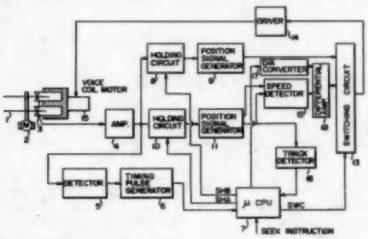
first generation means for generating a first position signal on the basis of the position data from said readout means, in accordance with a first instruction;

second generation means for generating a second position signal on the basis of the position data from said readout means, in accordance with a second instruction, the second position signal having a predetermined waveform;

speed difference detecting means for detecting a speed signal with respect to the head in accordance with the first position signal from said first generation means, and for determining and outputttting a speed difference signal representing a speed difference between the detected speed signal and a designated speed signal input thereto;

switching means for selectively outputting one of the second position signals from said second generation means and the speed difference signal from said speed difference signal generation means in accordance with an input third instruction;

control means for detecting a distance between a current



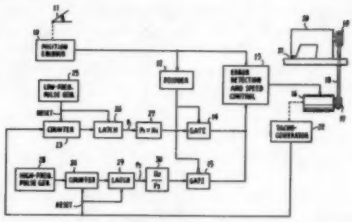
track position of said head and a destination track position designated by a seek instruction based on the first position signal, for outputting the designtated speed signal to said speed difference detecting means such that a drive operation of said head is initiated before a seek instruction is completely input and such that the speed of said head is decelerated gradually from a first predetermined distance to the destination track position, said control means for outputting the first instruction to said first generation means based on the position data, and for outputting the second instruction prior to the third instruction after the seek instruction is completely input, and for generating the third instruction when said head reaches within a second predetermined distance; and

head position driving means for driving said head on the basis of said input speed difference signal.

4,710,688
VARIABLE SPEED CONTROL WITH SELECTIVELY ENABLED COUNTER CIRCUITS

Shigeo Neki; Kenichi Ohara; Nobuho Shibata, and Takashi Dohi, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jun. 23, 1986, Ser. No. 877,425
Claims priority, application Japan, Jun. 24, 1985, 60-137214
Int. Cl.[4] G05B *19/29*
U.S. Cl. 318—603 **6 Claims**



1. A sewing machine having a motor for driving a needle armshaft, comprising:

means for generating a variable reference speed signal;

means for generating speed pulses at a frequency proportional to the rotational speed of said motor;

means for generating low-frequency clock pulses;

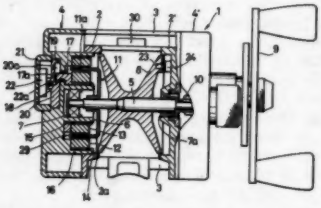
means for generating high-frequency clock pulses;
first speed detecting means including a first counter for counting said speed pulses during the interval between successive ones of said low-frequency clock pulses and deriving from the count a first actual speed signal proportional to the rotational speed of said motor;
second speed detecting means including a second counter for counting said high-frequency clock pulses during the interval between successive ones of said speed pulses and deriving from the count a second actual speed signal proportional to the rotational speed of said motor;
control means for controlling the rotational speed of said motor in response to a speed control signal applied thereto so that the speed control signal substantially equals the reference speed signal; and
means for applying said first actual speed signal to said speed control means as said speed control signal when said reference speed signal is higher than a predetermined value and applying said second actual speed signal to said control means as said speed control signal when said reference speed signal is lower than said predetermined value.

4,710,689

DEVICE FOR PREVENTING BACKLASH ON A FISHING REEL

Haruo Uetsuki; Takehiro Kobayashi, and Hiroto Yamane, all of Hiroshima, Japan, assignors to Ryobi, Ltd., Fuchu, Japan

Filed Jun. 20, 1986, Ser. No. 877,009
Claims priority, application Japan, Jun. 21, 1985, 60-94793[U]
Int. Cl.[4] G05B *11/01*
U.S. Cl. 318—630 **11 Claims**



1. A device for preventing backlash on a fishing reel wherein said reel includes a spool and a nonmagnetic electroconductive member rotated therewith, said member at times applying a braking force upon generation of an eddy current therein, said device comprising:
a sensor for detecting rotation of said spool and generating an output signal, said output signal being comprised of pulses relating to rotation of said spool;
a reference clock circuit for generating reference pulses at predetermined time intervals;
counter means including a circuit for counting the number of said pulses from said sensor and said reference clock circuit;
means governed by said counter means for calculating at least the speed of rotation of said spool; and
control means governed by said calculating means for generating an eddy current in said nonmagnetic electroconductive member at times when the speed of said spool reaches a preset value.

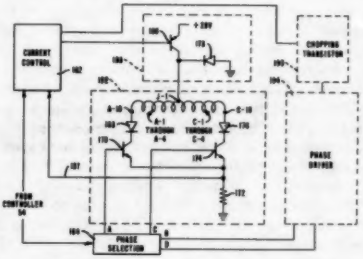
4,710,690

CLOSED-LOOP CONTROL SYSTEM FOR A STEPPING MOTOR

Bruce A. Reid, Elmira, and John R. M. Deline, Kitchener, both of Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Jul. 3, 1986, Ser. No. 881,754
Int. Cl.[4] G05B *19/40*
U.S. Cl. 318—685 **9 Claims**

1. A control system for a stepping motor operable in start, run, and stop modes of operation and having windings and a rotor moveable in rotation through a plurality of stable positions, said control system comprising:
means for indicating the position of said rotor including first and second detectors having first and second outputs, respectively; and
a controller means for receiving said first and second outputs of said first and second detectors and for energizing said windings in said start, run, and stop modes of operation;
said controller means including means for determining the stepping velocity of said rotor; and
said controller means utilizing the first and second outputs of said first and second detectors to engergize said windings with at least a two step lead angle in said run mode of operation when said stepping velocity reaches a predetermined rate;
said controller means comprising;



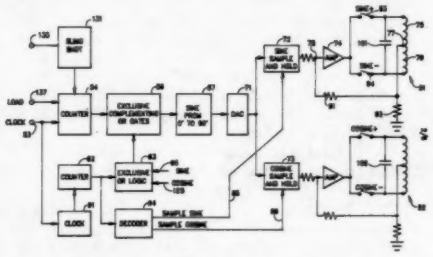
mans for generating an interrupt signal from said first and second outputs,
means for determining which of said start, run, or stop modes of operation said stepping motor is bieng operated in whenever a said interrupt signal occurs;
start, run, and stop tables; each said start, run, and stop table having a plurality of phases denting which of said windings are to be energized and not energized for the various combinations of the first and second outputs from said first and second detectors;
means for seleting the phase in said start, run, and stop tables to be utilized in energizing said windings; and
means for energizing said windings in response to said phase selected.

4,710,691

PROCESS AND APPARATUS FOR CHARACTERIZING AND CONTROLLING A SYNCHRONOUS MOTOR IN MICROSTEPPER MODE

Donald J. Bergstrom, San Diego, and Allan J. Wolfer, Encinitas, both of Calif., assignors to Anacomp, Inc., Carmel, Ind.

Filed Mar. 27, 1986, Ser. No. 845,923
Int. Cl.[4] H02P *8/00*
U.S. Cl. 318—696 **28 Claims**



1. A method for characterizing the angular velocity of a stepper motor operating in microstepper mode with sine/cosine motor excitation currents, the motor being controlled in

rotational speed by the frequency of the excitation pulses, said frequency being controlled by signals from a memory, the motion of the motor being repeatable with identical input excitation signals, said method comprising the steps of:

generating an initial predetermined nominal frequency;

energizing the motor at the nominal frequency;

measuring time differences to reach predetermined desired positions of the motor;

converting said time difference measurements into digital signals representing frequency correction terms in a form acceptable to the memory; and

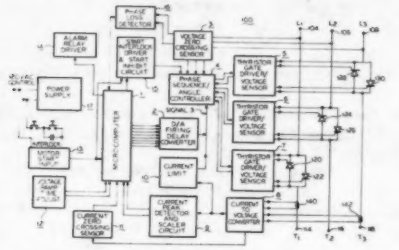
entering said frequency correction term in the memory for each time error detected.

4,710,692

SELF CALIBRATION OF THE THYRISTOR FIRING ANGEL OF A MOTOR CONTROLLER USING A CURRENT WINDOW TO DETERMINE A FINAL VALUE OF A REFERENCE CURRENT LAG PHASE ANGLE

James T. Libert, Waukesha, and Earl J. Curran, Jr., South Milwaukee, both of Wis., assignors to Square D Company, Palatine, Ill.

Filed Oct. 16, 1986, Ser. No. 919,915
Int. Cl.[4] H02P *5/40*
U.S. Cl. 318—729 **15 Claims**



1. An improved motor controller having,

a plurality of thyristors for controlling electric current flow to an electric motor;

a firing circuit for firing said thyristors at a selected firing angle;

means for measuring a current lag as a phase angle between a power line voltage and electric current flow to said motor;

wherein the improvement comprises:

means for selecting a temporary value of a reference current lag;

means for selecting said firing angle to adjust a current lag measured by said "means for measuring a current lag" to be substantially equal to said reference current lag;

means for determining that a current flow to said motor is between an upper predetermined motor current and a lower predetermined motor current; and,

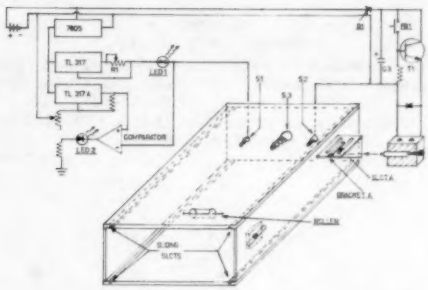
means, responsive to said "means for determining that a current flow to said motor is between an upper predetermined motor current and a lower predetermined motor current", for replacing said temporary value of said reference current lag with a final value of said reference current lag in response to said motor current being between said upper predetermined motor current and said lower predetermined motor current.

4,710,693

FRONT LOADING CONTINUOUS CHARGER

Arthur H. Wigell, 6647 Wheeler Ave., La Verne, Calif. 91750

Filed Apr. 17, 1987, Ser. No. 39,443
Int. Cl.[4] H02J *7/00*; **H01M** *10/46*
U.S. Cl. 320—2 **5 Claims**



1. A front loading continuous charging facility for radio headphones or other device using rechargeable batteries comprising:

an outer enclosure having an electrically releasable latch,

a drawer slidable within the outer enclosure having latch engagement means releasably engaged by said latch,

a depression in the drawer of shape complementary to the shape of the device to be charged,

resilient contacts in the drawer co-operable with complementary contacts on said device to be charged when contained in the drawer and the drawer is closed, and

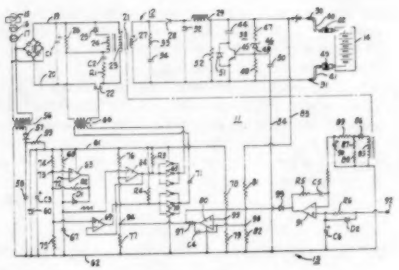
a voltage and current regulated power supply circuit in said enclosure coupled to said contacts.

4,710,694

MICROPROCESSOR CONTROLLED BATTERY CHARGER

Richard C. Sutphin, Cuba, N.Y.; Steven R. Bell, Shinglehouse, Pa., and Kurt Monsell, Portville, N.Y., assignors to Acme Electric Corporation, Olean, N.Y.

Filed Jun. 2, 1986, Ser. No. 869,684
Int. Cl.[4] H02J *7/00*
U.S. Cl. 320—21 **15 Claims**



1. A microprocessor controlled battery charger adapted to be connected to a battery to be charged, said battery charger comprising, in combination:

means to connect the battery charger to the battery to be charged;

means to read the voltage of the battery;

a timer;

a microprocessor connectecd to said timer and to said voltage reading means for establishing a first charging rate for at least a short time period and for establishing a reduced

second charging rate until the rate of change of voltage with time is less than x/100 volts per hour at which time the current is further reduced to a third charging rate for a finishing charge of the battery, where x is a positive number; and

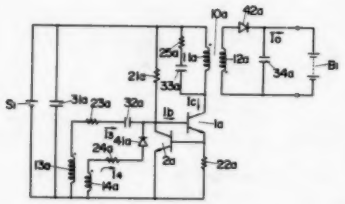
selector means to select the value of said first charging rate.

4,710,695

POWER SUPPLY CIRCUIT

Satoshi Yamada, and Kaoru Furukawa, both of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Oct. 1, 1986, Ser. No. 914,040
Claims priority, application Japan, Oct. 14, 1985, 60-228147
Int. Cl.[4] H02J 7/10; H02M 3/335
U.S. Cl. 320—21 **10 Claims**



1. A power supply circuit of ringing choke converter type adapted in use to charge a battery from a dc power source comprising:

a transformer having its primary winding connected to the dc power source and having its secondary winding connected to the battery to be charged;

a switching transistor connected in series with the primary winding

a series combination of a resistor and a speedup capacitor connected in the base-emitter path of the switching transistor to be cooperative with the switching transistor and the transformer to form a blocking oscillator in which the switching transistor is controlled to alternately turn on and off to interrupt the current to the primary winding and thereby develop an induced voltage across the secondary winding;

first and second feedback windings provided in the transformer and connected in the base-emitter path of the switching transistor;

said first feedback winding being connected to the series combination of the resistor and the speedup capacitor so as to provide a first current to the base of the switching transistor to trigger it on; and

said second feedback winding being connected in a parallel relation with the combination of the first feedback winding and the speedup capacitor so as to provide a second current which is added to said first current to be applied to the base of the switching transistor to maintain the switching transistor conductive.

4,710,696

CONTROL DEVICE FOR CONTROLLABLE ELECTRIC VALVE

Fumio Mizohata, and Takao Kawabata, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1986, Ser. No. 919,056
Claims priority, application Japan, Oct. 16, 1985, 60-228765
Int. Cl.[4] G05F 1/613
U.S. Cl. 323—223 **13 Claims**

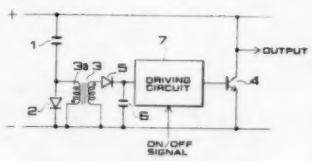
1. A device for controlling a three-terminal controllable electric valve connected between positive and negative lines comprising:

a driving circuit for supplying a driving signal to a control terminal of said controllable electric valve in response to an ON signal from outside; and

means for supplying to said driving circuit an electric current necessary for its operation making use of an electric current delivered from said positive and negative lines, which includes:

(a) a transformer incuding a primary winding and a secondary winding, a first end of said secondary winding being connected to said negative line;

(b) a first capacitor connected between said positive and negative lines for storing electric charge while said con-



trollable electric valve is in a non-conductive state and for conducting its discharging current through said primary winding of said transformer when said controllable electric valve is brought into a conductive state; and

(c) a second capacitor having an end connected to a second end of said secondary winding of said transformer to be charged with an electric current induced in said secondary winding;

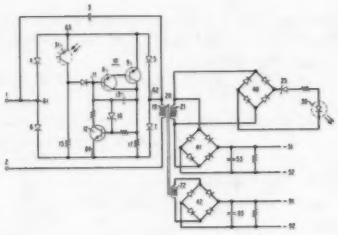
the input terminal of said driving circuit being connected with a junction of said secondary winding of said transformer and said second capacitor.

4,710,697

OFF-LINE SERIES TYPE REGULATING POWER SUPPLY

John Tardy, Somerville, N.J., assignor to American Telephone and Telegraph Company AT&T Technologies, Inc., Berkeley Heights, N.J.

Filed Apr. 3, 1986, Ser. No. 847,939
Int. Cl.[4] G05F 1/44
U.S. Cl. 323—239 **6 Claims**



1. A power supply comprising:

an input for accepting an AC signal,

an output circuit for accepting a load to be energized,

a power transformer including a primary winding and a secondary winding,

a power regulating transistor for coupling the input to the primary winding,

means for constraining current flow in the power regulating transistor to be unidirectional,

a bias circuit for causing the power regulating transistor to operate in a saturated low impedance conduction mode and responsive to a control signal to cause the power regulating transistor to operate in an active high impe-

dance conduction mode for series regulating current flow in the power regulating transistor,

a voltage threshold detection device coupled to the secondary winding and separate from the output and operative for generating a control signal when a voltage of the secondary winding achieves a predetermined threshold value,

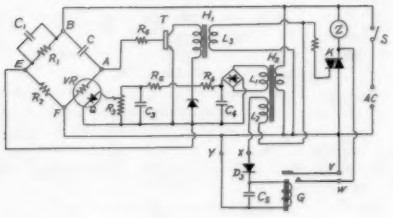
the voltage threshold detection device having a threshold level such that the voltage threshold detector device is continuously operative in a breakdown mode in each half cycle of the AC signal between a finite time after a beginning of the half cycle and a finite time preceding a termination of the half cycle,

feedback circuitry for coupling the control signal to the bias circuit including a light emitting device responsive to the voltage threshold detector device and a light responsive device operative to utilize the control signal to bias the power regulating transistor into its active high impedance conduction mode for series regulating current flow through the power regulating transistor.

4,710,698
PHASE-CONTROLLED AUTOMATIC SWITCHING CIRCUIT

Kazumi Masaki, Osaka, Japan, assignor to Ken Hayashibara, Okayama, Japan

Filed May 28, 1986, Ser. No. 869,457
Claims priority, application Japan, Jun. 5, 1985, 60-122058
Int. Cl.[4] G05F *1/455*
U.S. Cl. 323—239 **7 Claims**



1. In a phase-controlled switching circuit which comprises a controlled rectifier having a main current path connected with an ac source through a load, and means for triggering the gate of the controlled rectifier while keeping an initial conduction angle thereof small, the improvement whereby the heat generation of the controlled rectifier is reduced, comprising

a pair of mechanical contacts connected in parallel with the main current path of the controlled rectifier, and means for closing the mechanical contacts when the operation of the load reaches a stationary level, to thereby short circuit said controlled rectifier,

wherein

a control signal is provided to said controlled rectifier with a phase relative to a phase of the voltage of said ac source to provide said small initial conduction angle and to increase said conduction angle thereof as said operation of the load reaches said stationary level, and

a signal corresponding to said control signal is superposed with a voltage of said ac source to provide an activation signal for supplying power from said ac source to said closing means for closing said mechanical contacts when said operation of the load reaches said stationary level,

said circuit further comprising

a further switch with a lower current switching capacity, and

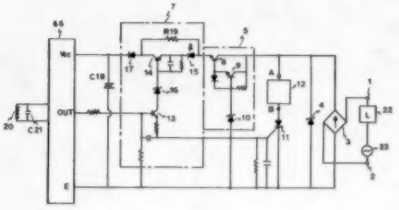
a time constant circuit that charges upon the closing of said further switch,

wherein said phase angle is controlled by the charging of said time constant circuit, and said phase angle controls the superposing to produce said activation signal for closing said mechanical contacts according to said phase angle.

4,710,699
ELECTRONIC SWITCHING DEVICE

Kiyoshi Miyamoto, Otsu, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Oct. 15, 1984, Ser. No. 660,675
Claims priority, application Japan, Oct. 14, 1983, 58-192923; Oct. 14, 1983, 58-192924; Jan. 18, 1984, 59-6440; Jan. 18, 1984, 59-6442
Int. Cl.[4] H03K *17/78;* H02H *9/02*
U.S. Cl. 323—324 **7 Claims**



1. An electronic switching device including means for controlling the flow of current from an external source through an external load, comprising:

input means rendered operable by a voltage produced by said external source and load and for producing an operating signal responsive to a predetermined external condition,

power switching means in a series circuit with said external source and said external load and connected to receive said output signal from said input means for switching current flow through said series circuit responsive to said output signal,

current detecting means coupled to said power switching means for detecting abnormally large currents flowing through said power switching means and for producing a limiting signal responsive to the appearance of an abnormally large current equal to or greater than a predetermined value,

current limiting means connected in series with said power switching means for interrupting the current flow therethrough, said current limiting means being coupled to said current detecting means whereby said current limiting means is operated responsive to the appearance of said limiting signal and

holding circuit means coupled to said current limiting means for maintaining the current limiting means in an operative state for interrupting flow through said power switching means for a predetermined period of operation of said electronic switching device.

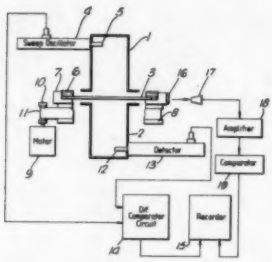
4,710,700
METHOD OF MEASURING ORIENTATION OR DIELECTRIC CHARACTERISTIC OF DIELECTRIC SHEETS OR WEBS

Shigeyoshi Osaki, Hyogo, and Yoshihiko Fujii, Osaka, both of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Sep. 18, 1985, Ser. No. 777,453
Claims priority, application Japan, Sep. 22, 1984, 59-199225
Int. Cl.[4] G01R *27/04;* G01B *5/16*
U.S. Cl. 324—58.5 A **2 Claims**

1. A method of measuring the molecular orientation of the constituents of a dielectric sheet or web by means of dielectric constant and/or dielectric loss, comprising the steps of inserting a sample portion of the dielectric sheet or web in a small

clearance in a cavity resonator formed by a pair of waveguides, each of said waveguides having a rectangular cross section which is open at one end thereof, one of said waveguides having a transmitting antenna and the other waveguide having a receiving antenna, said waveguides being spaced apart from each other with their openings defining said clearance therebetween, irradiating said sample portion with frequency sweep type linearly polarized microwaves emitted by said transmitting antenna and its associated waveguide perpendicularly to said sample portion, producing a relative rotation between the plane of polarization of said microwaves and said sample portion around the axis of said cavity resonator by rotating said



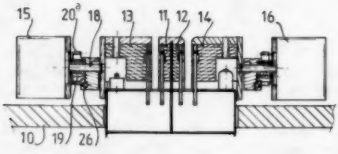
dielectric sheet or web relative to said pair of waveguides, measuring the resonance frequency "f" of the microwaves received by said receiving antenna and/or Q value "Q" of the waveguides with the sample portion located at predetermined angular positions so as to interrupt the relative rotation for each aforesaid measurement, and thereafter determining anisotropic dielectric constants and/or anisotropic dielectric losses from the relation between the resonance frequencies "f" and "fo" and/or the relation between the value "Q" and "Qo", wherein the "fo" and "Qo" are the resonance frequency and the Q value in the initial state of the waveguides without the sample portion.

4,710,701

CAPACITIVE CELL FOR CONTINUOUS MEASUREMENT OF THE LINEAR MASS OF TEXTILE PRODUCTS

Daniel Strentz, Mulhouse, France, assignor to Superba S.A., Mulhouse, France

Filed Jun. 26, 1986, Ser. No. 879,136
Claims priority, application France, Sep. 24, 1985, 85 14234
Int. Cl.[4] G01R *27/26*; B65H *63/06*
U.S. Cl. 324—61 P **5 Claims**



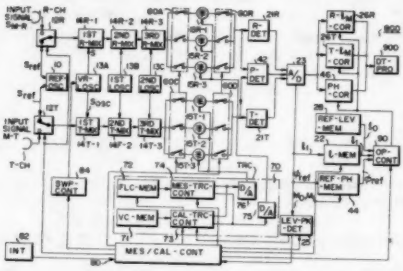
1. Device having two identical air capacitors for continuous measurement of a linear mass of textile products, wherein a thread is passed through an air gap of one of the capacitors, and wherein said thread's presence causes differences in capacitance between the two capacitors which are used to detect any irregularities in the thread, comprising means of simultaneously modifying the air gap of both capacitors to enable different grades of material to be monitored.

4,710,702

HETERODYNE TYPE SIGNAL-MEASURING METHOD AND A MEASURING APPARATUS INCLUDING AUTOMATIC DETUNING CORRECTION MEANS

Hiroshi Itaya, Isehara, and Goro Saito, Aikawamachi, both of Japan, assignors to Anritsu Corporation, Tokyo, Japan

PCT No. PCT/JP86/00183, § 371 Date Dec. 10, 1986, § 102(e) Date Dec. 10, 1986, PCT Pub. No. WO86/06174, PCT Pub. Date Oct. 23, 1986
PCT Filed Apr. 14, 1986, Ser. No. 2,692
Claims priority, application Japan, Apr. 13, 1985, 60-78755; Apr. 13, 1985, 60-78756
Int. Cl.[4] G01R *23/14*
U.S. Cl. 324—79 R **23 Claims**



1. A heterodyne type signal measuring method comprising the steps of:

generating a reference signal having a reference frequency and a predetermined signal level;

generating a variable frequency signal whose oscillating frequency is varied within a given range;

producing a signal having an intermediate frequency by receiving either the reference signal, or a signal to be measured so as to be heterodyne-mixed with said variable frequency signal;

resolution-bandwidth-filtering the intermediate frequency signal;

acquiring a peak level value in said bandwidth-filtering step upon receipt of said reference signal while the frequency of said variable frequency signal is varied;

correcting the detuning occurring in said filtering step based upon said peak level value; and

calculating a level of said input signal which has been bandwidth-filtered when said input signal to be measured is received so as to correct a level error caused by the detuning, based upon said peak level value, whereby the level of said input signal can be measured under the correct level by correcting the detuning error occurring at said filtering step when the level of said input signal is measured.

4,710,703

DIRECTION SENSING SYSTEM FOR AN AC POWER SUPPLY AND AC MOTOR DRIVE WITH SUCH DIRECTION SENSING SYSTEM

Gary A. Harkiewicz, West Seneca, and Paul W. Wagener, Alden Township, Erie County, both of N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 15, 1986, Ser. No. 819,083
Int. Cl.[4] G01R *25/00*
U.S. Cl. 324—86 **4 Claims**

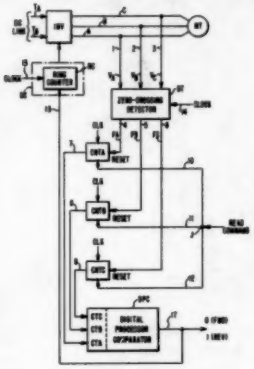
1. A method of ascertaining the phase rotation of the three AC phase voltages of a three-phase AC power supply; said phase voltages being viewed in a predetermined order; comprising the steps of:

sensing each of said phase voltages to derive a representative waveform thereof;

detecting for each of said representative waveforms a zero-crossover;

counting for each waveform and simultaneously for all phases the amount of electrical degrees accumulated from the corresponding detected zero-crossover to derive a corresponding phase count;

establishing by pairs for each consecutive phases in a predetermined order of succession corresponding to said predetermined order a reference sign of inequality between the



accumulated electrical angles on such pairs of consecutive phases;

comparing in magnitude said phases counts as derived to derive an actual sign of inequality between phase counts in each pair; and

deriving a phase rotation representative signal from matching said reference signs of inequality with said actual signs of inequality.

4,710,704

IC TEST EQUIPMENT

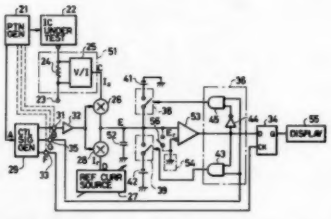
Masakazu Ando, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan

Filed Oct. 15, 1985, Ser. No. 787,032

Claims priority, application Japan, Oct. 15, 1984, 59-155218[U]

Int. Cl.⁴ G01R *31/28*

U.S. Cl. 324—73 R **17 Claims**



1. IC test equipment connected to receive a reference voltage and comprising:

a test pattern generator for generating a test pattern;

a current converter for converting a power supply current of the IC under test to a corresponding current;

a reference current source for producing a reference current reverse in polarity from said output current of the current converter;

an integrating capacitor;

first and second switches, connected between said integrating capacitor and said current converter and connected between said integrating capacitor and said reference current source, respectively;

a switch drive circuit, connected to said first and second switches, for providing a switch control signal for simultaneously controlling said first and second switches to open and close in synchronism with said test pattern;

a comparator, connected to said integrating capacitor and connected to receive the reference voltage, for comparing the voltage of said integrating capacitor and the reference voltage, and for providing a corresponding output;

reset means, connected to said integrating capacitor, for generating a reset signal and making the voltage of the integrating capacitor equal to the reference voltage when the first and second switches are open, said reset means including:

a positive power source and a negative power source, connected to said integrating capacitor, said positive power source increasing the voltage across said integrating capacitor and said negative power source reducing the voltage across said integrating capacitor;

third and fourth switches connected to said positive and negative power sources, respectively, and to said integrating capacitor; and

switch control means, connected to said comparator, for receiving said reset signal and the output from said comparator, and selectively turning on one of said third and fourth switches in accordance with the comparison between the voltage of said integrating capacitor and the reference voltage, when the voltage of said integrating capacitor is higher than the reference voltage said fourth switch is turned on and when the voltage of said integrating capacitor is lower than the reference voltage said third switch is turned on;

a flip-flop, operatively connected to said comparator and said reset means, for receiving the output of said comparator during a time interval between the turning-OFF of said first and second switches and a resetting of the flip-flop by the reset means; and

control signal generating means, connected to said switch drive circuit, said reset means, said test pattern generator and said flip-flop, for generating the switch control signal, the reset signal and a strobe pulse in synchronism with said test pattern.

4,710,705

NOISE REMOVAL CIRCUIT FOR USE IN A PARTIAL DISCHARGE MEASURING DEVICE OF A HIGH VOLTAGE APPARATUS

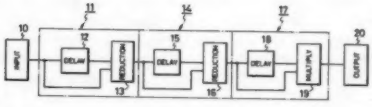
Osamu Kawabata, Kanagawa, Japan, assignor to Fuji Electric Company, Ltd., Kawasaki, Japan

Filed Sep. 26, 1985, Ser. No. 780,170

Claims priority, application Japan, Sep. 28, 1984, 59-203686; Dec. 20, 1984, 59-268979; Jan. 28, 1985, 60-14102; Sep. 19, 1985, 60-207590

Int. Cl.⁴ G01R *19/00, 23/16;* H04B *1/10*

U.S. Cl. 324—102 **9 Claims**



1. A noise removing circuit for use in a partial discharge measuring device for use with a high voltage apparatus responsive to an input signal composed of a partial discharge pulse signal having a pulse width in a predetermined time range and periodic noise having a period of time longer than said predetermined time range for removing the noise without deforming a waveform of the partial discharge pulse signal, said circuit comprising:

first phase shift/reduction means, responsive to the input signal, for passing the input signal directly and delaying the input signal by a predetermined time, for reducing the

delayed input signal with the directly passed input signal and producing an output,

second phase shift/reduction means for passing the output of the first phase shift/reduction means directly and delaying the output by the predetermined time for reducing the delayed output with the directly passed output and producing an output signal, and

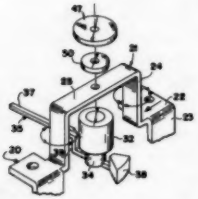
phase shift/multiplying means for directly passing the output signal of the second phase shift/reduction means while delaying the output signal by a time twice as much as the predetermined time and for multiplying the directly passed output signal from the second phase shift/reduction means with the delayed output signal.

4,710,706

ELECTRICAL MEASURING METER AND METHOD INCLUDING A CALIBRATING ELEMENT

Robert L. Krupa, Jr., Parma Heights, Ohio, assignor to Prime Instruments, Inc., Cleveland, Ohio

Filed Aug. 9, 1985, Ser. No. 764,800
Int. Cl.[4] G01R *35/04, 1/20*
U.S. Cl. 324—146 **20 Claims**



1. In an electrical measuring meter, a polarized motor magnet mounted for movement to and from a starting position, a permanent, polarized holding magnet operative magnetically to influence said motor magnet towards such starting position, and calibrating means magnetized by said holding magnet and positioned between said holding magnet and motor magnet to effect a partial cancellation of the holding magnet's influence on said motor magnet.

4,710,707

HIGH VOLTAGE ELECTRONIC COMPONENT TEST APPARATUS

Terence J. Knowles, Lincolnshire; Francis M. Ray, Glenview, and Charles E. Shewey, Mundelein, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Jan. 16, 1985, Ser. No. 692,583
Int. Cl.[4] G01R *19/15*
U.S. Cl. 324—158 F **13 Claims**

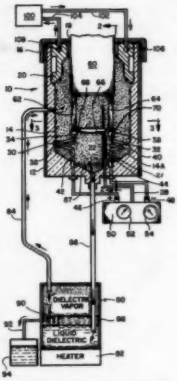
1. Apparatus for applying a high voltage across an electronic component having a pair of leads and measuring a small current therein, said apparatus comprising:

a housing having an opening leading to a chamber therein;

first and second electrodes positioned within said chamber and adapted for electrical contact with a respective axial lead of an electronic component inserted within said chamber through the opening in said housing;

voltage generating and current measuring means coupled to said first and second electrodes for applying a high voltage thereacross and measuring the current within an electronic component coupled to said electrodes;

fluid circulating means coupled to said chamber and containing a liquid dielectric for converting said liquid dielectric to vapor form and providing the vapor dielectric to said chamber for electrically isolating said first and second electrodes, wherein the vapor dielectric condenses to liquid form within said chamber and returns to said fluid circulating means for re-vaporization and return to said chamber, said fluid circulating means including a heated reservoir for receiving the dielectric in liquid form from said chamber and for converting said dielectric to a vapor for diffusion back into said chamber; and



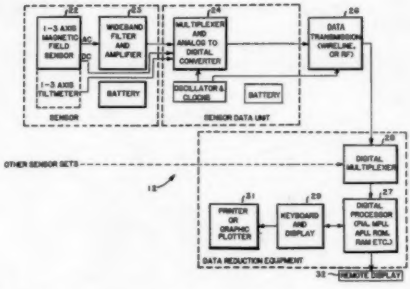
means within said heated reservoir for removing water from the liquid dielectric therein.

4,710,708

METHOD AND APPARATUS EMPLOYING RECEIVED INDEPENDENT MAGNETIC FIELD COMPONENTS OF A TRANSMITTED ALTERNATING MAGNETIC FIELD FOR DETERMINING LOCATION

Louis H. Rorden, Los Altos, and Thomas C. Moore, Sunnyvale, both of Calif., assignors to Develco, San Jose, Calif.

Continuation-in-part of Ser. No. 257,645, Apr. 27, 1981, abandoned, which is a continuation-in-part of Ser. No. 36,017, May 4, 1979, abandoned. This application Jul. 23, 1982, Ser. No. 401,267
Int. Cl.[4] G01B *7/14;* **G01C** *21/00;* **G01S** *3/02;* **G01G** *7/78*
U.S. Cl. 324—207 **20 Claims**



15. In an apparatus employing an alternating magnetic field for determining location,

means for transmitting an alternating magnetic field from a transmitter station means;

means for receiving the transmitted alternating field at receiving station means spaced from said transmitter station means to derive a plurality of independent magnetic field components of the complex vector field being received, each of said independent magnetic field components having amplitude and phase information;

means for successively approximating the relative location of said transmitter and receiver station means one with respect to the other by using primarily the amplitude information of said derived independent magnetic field components, and successively determining said magnetic

field components that would have been received at said receiver station means for each approximated relative location; and

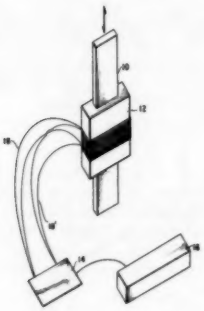
means for comparing said successively determined field components with said received field components to derive a convergence between the approximated relative locations of said transmitter and receiver station means for determining the relative locations of said transmitter and receiver station means one with respect to the other.

4,710,709

MAGNETOMECHANICAL TRANSDUCERS UTILIZING RESONANT FREQUENCY SHIFTS TO MEASURE DISPLACEMENT OF AN OBJECT

Philip M. Anderson, III, Chatham, and Jeffrey C. Urbanski, Sparta, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Nov. 4, 1983, Ser. No. 548,815
Int. Cl.[4] G01B 7/14; G01R 33/00
U.S. Cl. 324—207 **13 Claims**



1. A magnetomechanical-resonant-frequency transducer system responsive to the strength of a d.c. bias field on a target comprising:

a. means including a driving coil co-axial with said target for interrogating said target,

b. generating means for generating an a.c. magnetic field within said coil to effect direct magnetic coupling between said ac magnetic field and said target, said ac magnetic field incorporating the resonant frequency of said target;

c. means including a displaceable object, biasing means for generating said dc bias field and changing means for varying the relative displacement of said object and said target so as to vary the strength of said dc bias field on said target, thereby applying a variable d.c. bias field to said target to produce changes in the resonant frequency of said target that are correlated with displacement of said object; and

d. detection means for detecting the resonant frequency produced in said target by the strength of said dc bias field.

4,710,710

SCANNING APPARATUS AND METHOD FOR INSPECTION OF HEADER TUBE HOLES

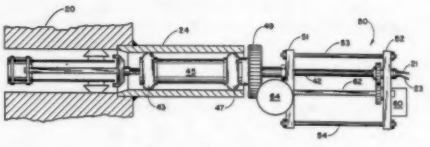
John H. Flora, Lynchburg; Robert E. Womack, Forest; Carlton E. Stinnett, and Claude W. Dalton, both of Lynchburg, all of Va., assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Apr. 22, 1986, Ser. No. 855,100
Int. Cl.[4] G01N 27/82; G01R 33/12
U.S. Cl. 324—220 **19 Claims**

1. An apparatus for scanning a peripheral surface encircling a portion of a header tube hole in a header while a tube stub having an inner diameter is seated within the hole, comprising:

a probe assembly capable of being inserted into the header tube hole having cantilevered spring means for resiliently urging at least one sensor mounted thereon into engagement with the peripheral surface to be scanned;

a tube stub mounting mechanism, capable of being inserted into the tube stub, having a central hollow cylinder connected to one end of the probe assembly, a flanged tube slidably disposed on the central hollow cylinder, a pair of expansible rings mounted on the flanged tube, and means mounted on the flanged tube for diametrically expanding



the rings into engagement with the tube stub inner diameter to facilitate support and reference for the apparatus; and

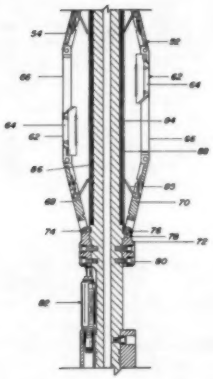
a drive carriage, attached to the tube stub mounting mechanism, having means for rotating the central hollow cylinder and the probe assembly connected to one end thereof so that the at least one sensor slides in the circumferential direction along the peripheral surface of the hole and means for axially translating the central hollow cylinder and the probe assembly connected to one end thereof so that the at least one sensor slides in the axial direction along the peripheral surface of the hole.

4,710,711

APPARATUS FOR NONDESTRUCTIVE TESTING OF SUBSURFACE PIPING USING THREE COILS WITH OPPOSING FIELDS

Arnold M. Walkow, Houston, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Dec. 4, 1985, Ser. No. 805,027
Int. Cl.[4] G01N 27/72, 27/82; G01R 33/12
U.S. Cl. 324—221 **3 Claims**



1. Apparatus for nondestructive testing of subsurface piping, comprising:

first and second non-magnetic housing members;

an elongated magnetic core member having a first end retained within said first housing member and a second end retained within said second housing member;

first and second arm carrier members coupled to said core

member, said arm carriers constructed of magnetic material for magnetic poles;

first coil assembly coupled to said core member between said first and second arm carrier members for inducing a unidirectional magnetic flux field along a portion of said piping;

second and third coil assemblies coupled to said core member longitudinally spaced on said core member outside said first and second arm carrier members, respectfuly, for emitting second and third unidirectional magnetic flux fields therefrom, said second and third fields being in opposition to said magnetic flux field from said first coil assembly;

detector means comprising a plurality of detector shoes coupled to said arm carrier members, said detector means located proximate said first coil assembly and between said second and third coil assemblies, said detector means adapted to contact the interior surface of said piping for sensing alterations in said flux field for indicating defects in said piping.

4,710,712

METHOD AND APPARATUS FOR MEASURING DEFECTS IN FERROMAGNETIC ELEMENTS

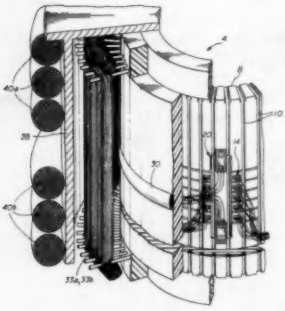
James E. Bradfield; John E. Kahil; Mark S. Jaynes; Gordon L. Moake; Marvin Milewits; Curtis W. Bolton, III; Clive C. Lam, and Roderic K. Stanley, all of Houston, Tex., assignors to PA Incorporated, Houston, Tex.

Filed Apr. 11, 1984, Ser. No. 599,053

The portion of the term of this patent subsequent to Jan. 8, 2002, has been disclaimed.

Int. Cl.[4] G01N *27/72, 27/82;* **G01R** *33/12*

U.S. Cl. 324—227 **67 Claims**



27. A tubing trip tool for determining at the well head the extent of defects in ferromagnetic tubing sections of a continuous tubing string used in a subterranean well bore as the tubing string travels into or out of the well bore, comprising:

means for measuring the axial velocity of each tubular section relative to a saturating magnetic field including means for detecting, at a fixed location within the saturating magnetic field, a first signal produced by the changing magnetic leakage fields emanating from the tubular section due to axial velocity of the tubular section and axial changes in the magnetic properties of the tubing section due to movement of each tubing section, means for detecting a second signal simultaneously produced by the magnetic leakage emanating from the section due to axial changes in the magnetic properties of the tubing section, and means for comparing the first and second signals to measure the velocity of the tubing string;

means transversely spaced from the tubing string for successively applying a saturating magnetic field along the length of each tubing section of sufficient intensity to saturate the portion of the tubing section within the saturating magnetic field as the tubing string travels axially relative to the wall head;

means transversely spaced from the tubing string for detecting the total magnetic flux generated by the saturated magnetic field in each tubing section;

means for correlating the total magnetic flux generated by the saturated magnetic field in each tubing section to the average wall thickness along the length of each tubing section;

means transversely spaced from the tubing string for detecting flux leakage in the saturated magnetic field of each tubing section;

means for correlating the flux leakage in the saturated magnetic field of each tubing section to the depth of defects in each tubing section;

means transversely spaced from the tubing string for applying a cyclic magnetic field to each tubing section in addition to the saturating magnetic field;

means transversely spaced from the tubing string for detecting driven fields induced in each tubing section by the cyclic magnetic field;

means for comparing the driven fields to the cyclic magnetic field; and

means for correlating the difference between the driven fields and the cyclic magnetic fields to the extent of axially extending defects, including wear defects due to sucker rod interference, located at discrete circumferential locations on each tubular section.

4,710,713

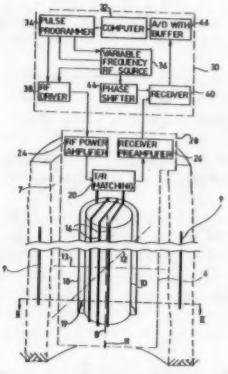
NUCLEAR MAGNETIC RESONANCE SENSING APPARATUS AND TECHNIQUES

Shmuel Strikman, both of Rehovot, Israel, assignor to Numar Corporation, Malvern, Pa. and Zvi Taicher

Filed Mar. 11, 1986, Ser. No. 838,503

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—303 **26 Claims**



1. Nuclear magnetic resonance sensing apparatus comprising:

at least one magnet operative to generate a static magnetic field in a region remote therefrom containing materials sought to be analyzed, said at least one magnet having a longitudinal axis and having a magnetization direction extending substantially perpendicularly to said longitudinal axis;

means for generating a radio frequency magnetic field in said remote region for exciting nuclei of the material sought to be analyzed and including at least one coil wound in a manner whereby the coil turns lie in planes substantially parallel to said magnetization direction and said longitudinal axis; and

receiving means for receiving nuclear magnetic resonance

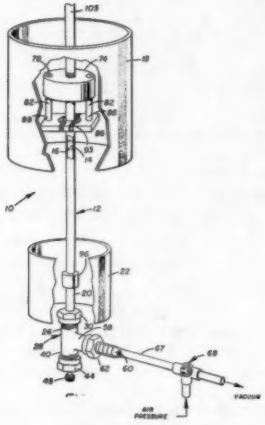
signals from the excited nuclei and for providing an output indication of properties of the material sought to by analyzed.

4,710,714

METHOD AND APPARATUS FOR MEASURING NUCLEAR MAGNETIC PROPERTIES

Daniel P. Weitekamp, 39 Kenyon Ave., Kensington, Calif. 94708; Anthony Bielecki; David B. Zax, both of Berkeley, Calif.; Kurt W. Zilm, Hamden, Conn., and Alexander Pines, Berkeley, Calif., assignors to The Regents of the University of California and Daniel Paul Weitekamp, both of Berkeley, Calif.

Filed Apr. 10, 1984, Ser. No. 598,844
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—307 **29 Claims**



1. A method for analyzing a sample comprising the steps of:
(a) polarizing the sample within a magnetic field having a selected first field intensity;
(b) reducing the magnetic field to a substantially zero intensity for a selected first time period;
(c) increasing the magnetic field to a second field intensity sufficient to maintain the polarization of the sample at the value existing at the end of said first time period;
(d) measuring the magnetization of said sample;
(e) repeating steps (a)-(d) for different durations of said first time periods; and
(f) determining the Fourier-transform of said measured magnetization as a function of said selected first time period.

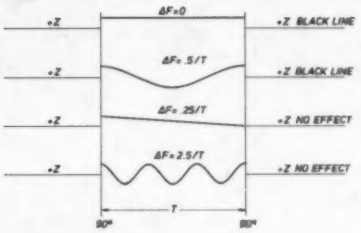
4,710,715

METHOD OF MAPPING MAGNETIC FIELD STRENGTH AND TIPPING PULSE ACCURACY OF AN NMR IMAGER

Gary L. Mee, and M. Robert Willcott, both of Houston, Tex., assignors to NMR Imaging, Inc., Houston, Tex.

Filed Apr. 23, 1985, Ser. No. 726,086
Int. Cl.[4] G01R *33/24*
U.S. Cl. 324—307 **2 Claims**

1. A method of measuring the accuracy of the tipping process of an NMR imager comprising the steps of tipping the spins through an angle equal to $2N+1$ times the angle through which the RF signal is suppose to tip the spins so that any inaccuracy is increased and will cause the spins to be moved toward alignment with the H_0 field and produce a dark band in



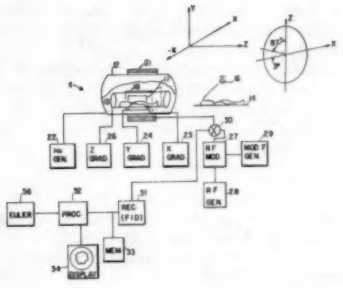
the image and obtaining the image to check the accuracy of the tipping process.

4,710,716

SLICE ORIENTATION SELECTION ARRANGEMENT

Hanan Keren, Kfar Saba, and David Freundlich, Haifa, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Sep. 20, 1985, Ser. No. 778,503
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **12 Claims**

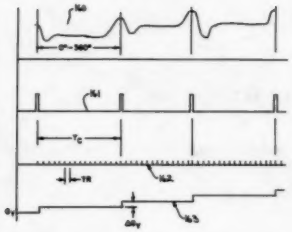


1. A method of imaging a subject using MRI systems wherein the selected imaging plane is at any desired angle to the usual X, Y and Z coordinate axes of said MRI system, the method comprises the steps of:
(a) subjecting the subject to a strong static magnetic field along the Z axis in order to align magnetic spins in the Z direction in said subject being imaged;
(b) applying magnetic gradient vector pulses to vary said static field;
(c) generating FID signals by applying RF magnetic pulses rotating at Larmor frequencies to nutate said spins;
(d) selecting desired non-orthogonal imaging planes by selectively rotating the direction of the magnetic gradient vectors by determined angular amounts about coordinate axes prior to applying the magnetic gradient vector pulses;
(e) determining the angular amount to rotate the magnetic gradient vectors about the coordinate axis using visual indicators; and
(f) projecting said visual indicators onto the image of said subject being imaged.

4,710,717
METHOD FOR FAST SCAN CINE NMR IMAGING

Norbert J. Pelc, Wauwatosa, and Gary H. Glover, Delafield, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Dec. 29, 1986, Ser. No. 947,211
Int. Cl.[4] G01R 33/20
U.S. Cl. 324—309 16 Claims



1. A method for producing an image with an NMR imaging system which depicts an object at a selected phase of its functional cycle, the steps comprising:

(a) repeatedly executing an NMR pulse sequence throughout a functional cycle to acquire a subset of NMR data, said execution being asynchronous with respect to said functional cycle to produce NMR data at each of a plurality of phases of the functional cycle, and said NMR pulse sequence including a position encoding gradient pulse;

(b) correlating the NMR data acquired during the execution of each NMR pulse sequence with the phase of the functional cycle at the time the NMR data is acquired;

(c) repeating steps (a) and (b) for a plurality of functional cycles with a different position encoding gradient pulse employed during each functional cycle to produce other subsets of NMR data;

(d) reconstructing an image at a selected phase of the functional cycle by interpolating between NMR data within each subset of acquired NMR data to produce a set of interpolated NMR data which is employed to produce the image.

4,710,718
SPATIALLY SELECTIVE NUCLEAR MAGNETIC RESONANCE PULSE SEQUENCES

Athan J. Shaka, Oxford, United Kingdom, assignor to Varian Associates, Inc., Palo Alto, Calif.

PCT No. PCT/US85/00593, § 371, Date, Dec. 3, 1985, § 102(e) Date Dec. 3, 1985, PCT Pub. No. WO85/04727, Pub. Date Oct. 24, 1985
PCT filed Dec. 3, 1985, Ser. No. 807,098
Claims priority, application Australia, Apr. 5, 1984, PG4432
Int. Cl.[4] G01R 33/20
U.S. Cl. 324—309 20 Claims

1. The method of exciting nuclear magnetic resonance in an exclusively selected aggregate of gyromagnetic resonators comprising the steps of

(a) imposing a polarizing magnetic field on said gyromagnetic resonators,

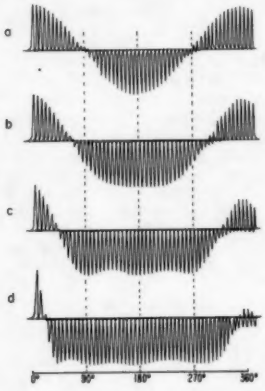
(b) flipping the magnetization representing said selected resonators by 180° about a first selected axis in a selected plane whereby the magnetization is re-oriented 180° as the first step of a composite continuous set of steps Q^m,

(c) applying an RF pulse to cause the magnetization vector to rotate by 180° about a second axis as another step of said composite continuous set Q^m, said second axis at +90° to said selected axis,

(d) flipping the magnetization by 180° as another step of said composite continuous set Q^m, said flipping reversed in sense from the flipping of step (b) whereby the step (b) is time reversed,

(e) accumulating a nuclear magnetic resonance signal, and

(f) repeating steps (b) through (c) at least through three further repetitions and for each said repetition,



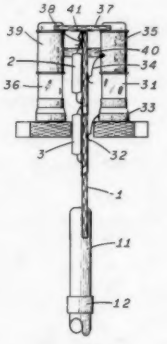
(1) cycling each said rotation or flip axis by advancing said axis 90° in the selected plane with respect to the preceding repetition, and

(2) reversing the algebraic sense of accumulation of the NMR signal for each adjacent accumulation.

4,710,719
HIGH VOLTAGE CAPACITOR WAND FOR HIGH POWER TUNED CIRCUITS

Francis D. Doty, Columbia, S.C., assignor to Doty Scientific, Inc., Columbia, S.C.

Filed Jan. 13, 1986, Ser. No. 818,486
Int. Cl.[4] G01R 33/20
U.S. Cl. 324—318 3 Claims

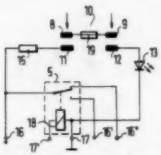


1. A detachable capacitor wand for a high power NMR probe coil circuit, said wand including at least two series connected high voltage capacitors, surface mounted on one side of a removable circuit board strip, with plated copper pads provided for making low electrical resistance contacts between said circuit board strip and said probe coil circuit at the junction and at opposite ends of said series connected capacitors, said probe coil circuit including plated spring contact fingers to engage said plated pads.

4,710,720
ARRANGEMENT FOR TESTING FUSES

Hans Weiner, Mühlacker, Fed. Rep. of Germany, assignor to Dr.Ing.h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 24, 1985, Ser. No. 758,373
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1984, 3427540
Int. Cl.[4] H01H *85/32*
U.S. Cl. 324—550 **10 Claims**



1. A fuse testing arrangement for testing fuses in a motor vehicle utilizing an existing current distribution system connected to a relay of said vehicle whereby said relay provides dual functionality and comprises:

test circuit means for individually and manually testing fuses in the motor vehicle;

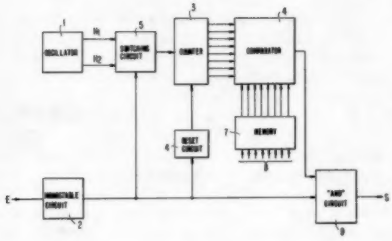
said test circuit means including in a series circuit, a current limiting resistance, a pair of electrical contacts, and an indicating means;

said test circuit means operable independently and in addition to normal operative functions of the relay.

4,710,721
APPARATUS FOR MONITORING THE PERIOD OF SEPARATION OF IMPULSES

Etienne Camus, Senlis, France, assignor to Jeumont-Schneider Corporation, Puteaux, France

Filed Feb. 20, 1986, Ser. No. 831,422
Claims priority, application France, Feb. 21, 1985, 85 02483
Int. Cl.[4] H03K *5/22*; G01R *19/145*
U.S. Cl. 328—109 **7 Claims**

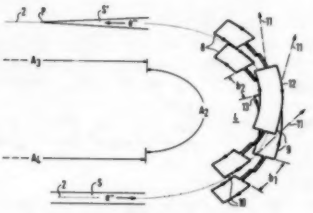


1. Apparatus for monitoring the period of separation between impulses, comprising a monostable circuit having an input to which said impulses are applied and an output on which said monostable circuit generates output pulses in response to the applied input impulses, oscillator circuit means having output means on which said oscillator circuit means generates a high frequency output signal and a low frequency output signal, counter circuit means having input means connected to receive said high frequency signal and said low frequency signal from said output means of said oscillator circuit means, switching circuit means connected for switching an input signal of said counter circuit means between said low frequency signal and said high frequency signal, said switching circuit means having a control input connected to said output of said monostable circuit and switching in response to the output pulses from said monostable circuit such that said counter circuit means is driven by said low frequency signal between output pulses from said monostable circuit and by said high frequency signal during output pulses from said monostable circuit, reset circuit means having a control input connected to said output of said monostable circuit and an output connected to reset said counter circuit means in response to trailing edges of the output pulses from said monostable circuit, comparator circuit means having input means connected to output means of said counter circuit means, said comparator circuit means comparing a number represented by a signal on the output means of said counter circuit means to a number corresponding to a predetermined period to be monitored and providing an output signal when the compared numbers coincide, and AND circuit means having an input connected to the output of said monostable circuit and another input connected to said output means of said comparator circuit means, whereby said AND circuit means provides an output signal when the period between successive impulses applied to the input of said monostable circuit is substantially the same as said predetermined period to be monitored.

4,710,722
APPARATUS GENERATING A MAGNETIC FIELD FOR A PARTICLE ACCELERATOR

Andreas Jahnke, Forchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich

Filed Feb. 26, 1986, Ser. No. 833,726
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508334
Int. Cl.[4] H05H *7/00, 13/00*
U.S. Cl. 328—234 **8 Claims**



1. Magnetic field-generating apparatus for an installation for accelerating electrically charged particles, the particle track of which has a plurality of curved and straight sections, comprising a plurality of main magnetic field generating windings located in the curved sections and at least one supplemental winding provided for focusing the particles on the particle track, the supplemental winding comprising a quadrupole triplet conductor arrangement in the region of at least one of the curved sections of the particle track, forming a quadrupole triplet for focusing the particles during acceleration, the turns of the supplement winding being arranged on both sides of the plane in which the article track is disposed.

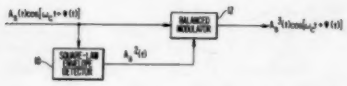
4,710,723
RECEIVER HAVING A MODULATION AMPLIFIER FOR ENHANCING RECEPTION OF A DESIRED SIGNAL IN THE PRESENCE OF INTERFERENCE

Guy Pelchat, Indialantic, and Luther L. Crabtree, Melbourne, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Apr. 4, 1986, Ser. No. 848,269
Int. Cl.[4] H03D *1/04*; H04B *1/10, 15/00*
U.S. Cl. 329—192 **29 Claims**

1. A receiver for receiving an input signal containing a desired signal component and an interference signal compo-

nent, wherein the improvement comprises means for amplifying the degree of a prescribed modulation of the input signal to



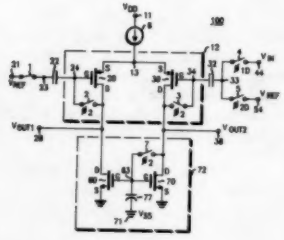
enhance detection of the desired signal component in the input signal in the presence of said interference signal component.

4,710,724

DIFFERENTIAL CMOS COMPARATOR FOR SWITCHED CAPACITOR APPLICATIONS

Lawrence E. Connell, Darien, and Ronald J. Webb, Elgin, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 2, 1986, Ser. No. 847,361
Int. Cl.[4] H03F *1/26, 3/45*
U.S. Cl. 330—9 **29 Claims**



1. A voltage comparator comprising:

a differential input stage including a pair of input devices connected in a differential amplifier configuration, said input stage having corresponding pairs of input terminals and output terminals;

a load stage including a first pair of load devices connected to said pair of output terminals, each load device having a control terminal thereof connected to a first common bias node; and

first means,including a first switched capacitor means connected to said first common bias node, for biasing said first pair of load devices to a bias point derived solely from at least one of said output terminals.

4,710,725

PREAMPLIFIER FOR AN IMAGING SYSTEM

Charles M. White, Liverpool, and Wayne T. Green, Mexico, both of N.Y., assignors to General Electric Company, Charlottesville, Va.

Filed Aug. 23, 1984, Ser. No. 643,408
Int. Cl.[4] H03F *1/14*
U.S. Cl. 330—51 **6 Claims**

1. A preamplifier for use in an imaging system including a charge-injection device comprising:

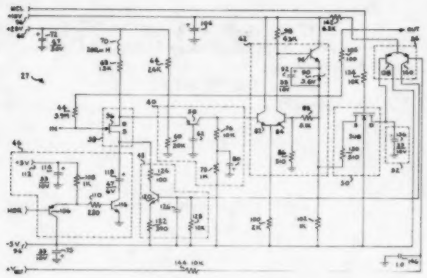
an amplifier for amplifying a video signal;

means for making said amplifier insensitive to an AC component of said video signal during at least a portion of a blanking interval of said video signal;

means for differencing an output of said amplifier during said at least a portion of a blanking interval with a reference voltage and for producing a DC bias therefrom;

means for connecting said DC bias to an input of said amplifier, whereby said output is driven toward a value equal to said reference voltage;

means for storing a voltage effective for producing said DC bias from the end of said at least a portion of a blanking interval until the next blanking interval; and



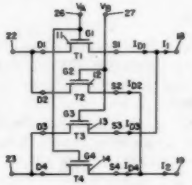
means for continuing to supply said DC bias existing at an end of said at least a portion of a blanking interval, whereby a DC bias required for proper operation of said amplifier is provided.

4,710,726

SEMICONDUCTIVE MOS RESISTANCE NETWORK

Zdzislaw Czarnul, New York, N.Y., assignor to Columbia University in the City of New York, New York, N.Y.

Filed Feb. 27, 1986, Ser. No. 834,321
Int. Cl.[4] H03F *1/34*
U.S. Cl. 330—69 **10 Claims**



1. A circuit arrangement including a two-port network whose transresistance is voltage-tunable over a linear range and which includes a pair of input terminals, a pair of output terminals, and a pair of control terminals, an input circuit branch connected between the input terminals, and an output circuit branch connected between the output terminals;

the two-port network comprising first, second, third and fourth matched MOS transistor, each having first and second current-carrying electrodes and a control electrode, and capable of operation in a non-saturated condition;

the first current-carrying electrode of each of the first and second transistors being connected to one of the input terminals and the first current-carrying electrode of each of the third and fourth transistors being connected to the other of the input terminals;

the second current-carrying electrode of each of the first and third transistors being connected to one of the output terminals, the second current carrying electrode of each of the second and fourth transistors being connected to the other of the output terminals;

the control electrode of each of the first and fourth transistors being connected to one of the control terminals and the control electrode of each of the second and third transistors being connected to the other of the control terminals; and

and voltage means connected to the control terminals for maintaining during operation each transistor continually conductive in a non-saturated region of its transfer charac-

teristic currents whereby the conductances of the transistors may be combined in the output circuit branch.

4,710,727

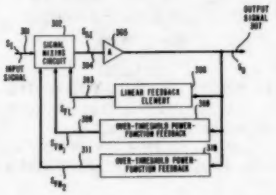
NONLINEAR DISTORTION SYNTHESIZER USING OVER-THRESHOLD POWER-FUNCTION FEEDBACK

Thomas E. Rutt, Asbury Park, N.J., assignor to Aardvark Audio Inc., Asbury Park, N.J.

Continuation-in-part of Ser. No. 771,235, Aug. 30, 1985, abandoned. This application Aug. 1, 1986, Ser. No. 892,350

Int. Cl.⁴ H03F *1/34*

U.S. Cl. 330—110 **22 Claims**



1. A circuit, responsive to an input signal, for use with an amplifier, which circuit comprises;

a signal-mixing means for providing an input signal to the amplifier in response to the input signal and at least one over-threshold power-function negative feedback signal; and

at least one negative feedback means for providing the at least one over-threshold power-function negative feedback signal in response to the amplifier output signal, which comprises:

(a) a peak-pass means, responsive to the amplifier output signal, for picking off predetermined portions of the amplifier output signal, to produce a peak-over-threshold signal, and

(b) a polarity-preserving power-function means, responsive to the peak-over-threshold signal, for producing the at least one over-threshold power-function negative feedback signal having an amplitude which is proportional to the peak-over-threshold signal level raised to a power greater than one.

4,710,728

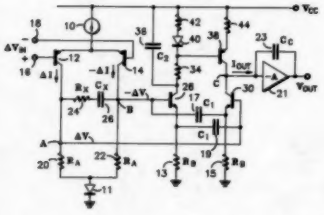
AMPLIFIER HAVING IMPROVED GAIN-BANDWIDTH PRODUCT

William F. Davis, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 30, 1986, Ser. No. 880,251

Int. Cl.⁴ H03F *3/45*

U.S. Cl. 330—252 **4 Claims**



1. An amplifier circuit having a unity gain frequency, comprising:

an input stage including first and second differentially coupled input transistors each having a base, emitter and collector terminals, said emitter terminals for coupling to a first source of supply voltage, and the base terminals being coupled to receive first and second input signals respectively, the collector terminals of said first and second input transistors forming first and second outputs;

a second stage including third and fourth differentially coupled input transistors each having base, emitter and collector terminals, said emitter terminals for coupling to a source of supply voltage, and said base terminals of said third and fourth transistors being coupled to receive said first and second outputs respectively, the collector terminal of said fourth transistor forming a third output;

first circuit means coupled to said input stage and to said second stage for generating first and second pole-zero pairs (P_A, Z_A) and (P_C, Z_C), said first circuit means comprising an RC series network having a first end coupled to the collector of said first input transistor and having a second end coupled to the collector of said second input transitsor, a first capacitor having a first terminal coupled to the collector at said second input transistor and to the base of said third input transistor and a second terminal coupled to the emitter of said fourth input transistor, and a third capacitor having a first terminal coupled to the collector of said first input transistor and to the base of said third input transistor and a second terminal coupled to the emitter of said third input transistor;

current mirror means for coupling between the collector terminals of said third and fourth transistors and said first source of supply; and

second circuit means coupled between the collector terminal of said third transistor and said current mirror means for producing a third pole-zero pair (P_B, Z_B).

4,710,729

MICROWAVE OSCILLATOR COMPRISING A DIELECTRIC RESONATOR INSENSITIVE TO MECHANICAL VIBRATIONS

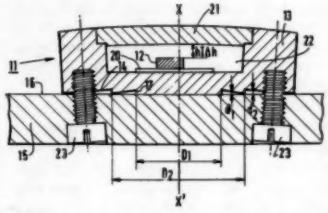
Daniel Doyen, Ozoir, and Tarcisio Vriz, Montgeron, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1986, Ser. No. 903,048

Claims priority, application France, Sep. 6, 1985, 85 13315

Int. Cl.⁴ H03B *5/18*

U.S. Cl. 331—96 **5 Claims**



1. An arrangement for minimizing the effect of vibration of the operating frequency of a dielectric resonator, said arrangement comprising:

(a) a housing having opposed first and second inner surfaces and an outer surface all extending transversely of a common axis, one of said inner surfaces being adapted for mounting the dielectric resonator in the vicinity of the axis;

(b) a support body having an outer surface extending transversely of the axis on which the housing is supported, said outer surface of the support body and the outer surface of the housing facing each other; and

(c) means for producing flexural strain in the housing when it is affixed to the support body, said means comprising:

(1) space-defining means for defining a space between predefined respective portions of the facing outer sur-

faces, said space including at least one location where said facing outer surfaces can be forced together to effect flexion of the housing; and

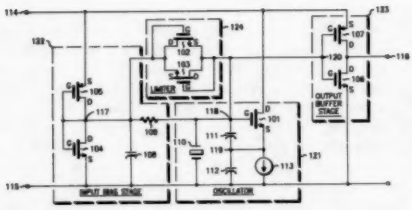
(2) affixing means, disposed at said at least one location, for locally forcing together the facing outer surfaces.

4,710,730

DATA CLOCK OSCILLATOR HAVING ACCURATE DUTY CYCLE

Joseph E. Doyle, III, Chicago, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 20, 1987, Ser. No. 28,287
Int. Cl.[4] H03B 5/32
U.S. Cl. 331—116 FE **20 Claims**



1. A crystal oscillator comprising:

oscillator means for generating an AC output signal, said oscillator means including tank circuit means for resonating at a predetermined operating frequency, and including feedback amplifier means for providing regenerative feedback to said tank circuit means to sustain oscillation, said oscillator means further including input means for accepting a bias signal and output means for providing said AC output signal having a first duty cycle and having an average DC value determined by said bias signal;

buffer means for amplifying said AC output signal, said buffer means including input means, coupled to said oscillator output means, for accepting said AC output signal, said buffer input means having a predefined switching threshold, said buffer means further including output means for providing a crystal oscillator output signal having a second duty cycle determined by said first duty cycle, said AC output signal average DC value, and said predefined switching threshold;

biasing means, coupled to said oscillator input means, for providing said bias signal, said biasing means adapted to track device parameter variations of said buffer means and adapted to vary said bias signal such that said average DC value of said AC output signal follows said predefined switching threshold over changes in temperature, supply voltage, and manufacturing processes, thereby providing a crystal oscillator output signal exhibiting a precise duty cycle.

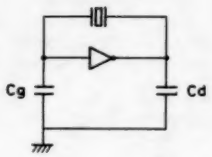
4,710,731

PLANAR TYPE THICKNESS SHEAR MODE QUARTZ OSCILLATOR

Mitsuyuki Sugita, and Isamu Hoshino, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jul. 15, 1986, Ser. No. 885,931
Claims priority, application Japan, Jul. 15, 1985, 60-155734
Int. Cl.[4] H03B 5/32
U.S. Cl. 331—158 **10 Claims**

1. An oscillator comprising a planar type thickness shear mode quartz resonator connected to a negative resistance oscillation circuit in which the proportion between the diameter and the thickness of the quartz resonator is so designed that the difference between the impedance of the quartz resonator



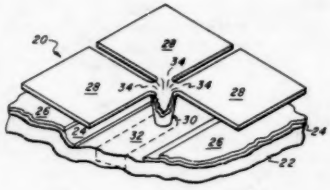
and the negative resistance of the oscillation circuit is greater in the third overtone than in other oscillation modes.

4,710,732

SPATIAL LIGHT MODULATOR AND METHOD

Larry J. Hornbeck, Van Alstyne, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 31, 1984, Ser. No. 635,966
Int. Cl.[4] G02F 1/27; B44C 1/22; H04N 5/74
U.S. Cl. 332—7.51 **8 Claims**



1. A method of fabricating a spatial light modulator with deflectable beams, comprising the steps of:

(a) apply a spacer on a substrate including electronic addressing circuitry;

(b) pattern said spacer to define post holes extending down to said subtrate;

(c) deposit a layer of metal on said spacer and post holes;

(d) define defectable beams in said metal so that each beam is hinged to the metal in one of said post holes;

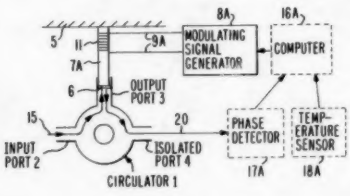
(e) remove said spacer.

4,710,733

R.F. PHASE MODULATOR

Philip D. Crill, Los Altos, and Michael D. Rubin, Saratoga, both of Calif., assignors to Ford Aerospace & Communications Corporation, Detroit, Mich.

Filed Oct. 28, 1986, Ser. No. 923,989
Int. Cl.[4] H01P 1/32
U.S. Cl. 332—26 **10 Claims**



1. A linear r.f. phase modulator comprising:

an r.f. sinusoidal carrier passing through a circulator having input, output, and isolated ports, said output port consisting solely of reflective, non-dissipative components;

fitting within an open end of the output port, a moving reflective surface coupled by a moving plunger to a housing fixedly mounted with respect to the circulator; and

means for generating a modulating signal; wherein

the modulating signal is applied to the plunger;

the position of the reflective surface within the output port is a linear function of the amplitude of the modulating signal; and

movement of the reflective surface changes the path length of the r.f. carrier within the circulator, thereby linearly phase modulating said carrier, which exits the isolated port substantially unattenuated.

4,710,734

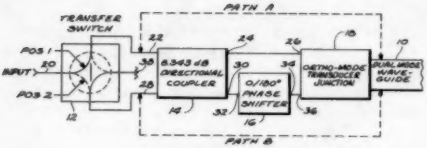
MICROWAVE POLARIZATION CONTROL NETWORK

William G. Sterns, Canoga Park, Calif., assignor to ITT Gilfillan, a division of ITT Corporation, Van Nuys, Calif.

Filed Jun. 5, 1986, Ser. No. 871,210

Int. Cl.⁴ H01P *1/10, 1/161, 1/17*

U.S. Cl. 333—101 **4 Claims**



1. A microwave polarization control network comprising a two position transfer switch for directing an input to one of two paths; a directional coupler having two ports, alternating as input and isolated ports, and two ports alternating as through output and coupled output ports; said two position transfer switch being connected to alternately switch an input to one or the other of said two ports of said directional coupler alternating as input and isolated ports and connect the other remaining one of said two ports, then called the isolated port, to a termination; an ortho-mode transducer junction having two input ports; means coupling one of said output ports to one input of said ortho-mode transducer junction; a 0/180° phase shifter coupled in series between the other of said output ports and the other input of said ortho-mode transducer junction; and a dual mode waveguide for transmitting a variable polarization output from said ortho-mode transducer junction to produce two sets of orthogonal linear polarizations.

4,710,735

ABSORPTION CIRCUIT

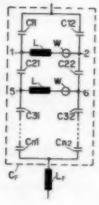
Leopold Blahous, Wettingen, and Gerhard Linhofer, Baden, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Dec. 17, 1985, Ser. No. 809,799

Claims priority, application Switzerland, Jan. 8, 1985, 59/85

Int. Cl.⁴ H03H *7/01, 7/06*

U.S. Cl. 333—175 **4 Claims**



1. In absorption circuitry for filtering current harmonics of the type having a filter choke in series with a symmetric array of filter capacitor branches in parallel, each filter capacitor branch including a series combination of at least two capacitors, the improvement comprising:

compensating choke means connecting at least two nodes between symmetrically corresponding capacitors in the parallel filter capacitor branches, the inductance of the compensating choke means being at least approximately equal to $1/\omega^2 C$ wherein ω is the angular frequency of a harmonic to be filtered and C is the total capacitance of the array of parallel filter capacitor branches, whereby the virtual capacitance of the absorption circuitry substantially retains its rated value after failure of a capacitor in the array.

4,710,736

FLEXIBLE WAVEGUIDES WITH 45° CORRUGATIONS TO ALLOW BENDING AND TWISTING OF WAVEGUIDES

Alan G. Stidwell, Higher Lake Farm, Woodland, Ashburton, TO13 7LL, Devon, United Kingdom

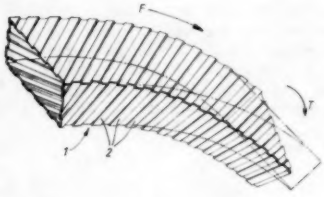
PCT No. PCT/GB84/00241, § 371 Date Mar. 4, 1985, § 102(e) Date Mar. 4, 1985, PCT Pub. No. WO85/00471, PCT Pub. Date Jan. 31, 1985

PCT Filed Jul. 5, 1984, Ser. No. 708,954

Claims priority, application United Kingdom, Jul. 5, 1983, 8318144

Int. Cl.⁴ H01P *3/14*

U.S. Cl. 333—241 **9 Claims**



1. A waveguide capable of being bent and twisted through substantial angles, and formed of discontinuity-free metal tubing with continuous corrugations of the wall of the waveguide extending all around the waveguide at an angle of substantially 45° to the longitudinal direction of the waveguide.

4,710,737

BAND SWITCHING CIRCUIT TUNER

Shigetoshi Matsuta, Soma, Japan, assignor to Alps Electric, Ltd., Japan

Filed Feb. 15, 1985, Ser. No. 702,045

Claims priority, application Japan, Feb. 15, 1984, 59-19985[U]

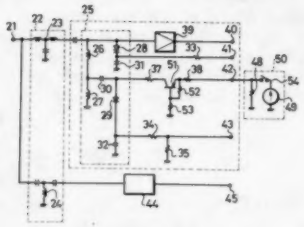
Int. Cl.⁴ H03J *5/24*

U.S. Cl. 334—56 **2 Claims**

1. In a band switching circuit coupled to a VHF tuner and a UHF tuner of the type having a switching diode with a PN junction which is forward biased to a conducting state to short-circuit a tuning coil for tuning said VHF tuner to a high VHF channel, reverse biased to a non-conducting state to render said tuning coil operative for tuning said VHF tuner to a low VHF channel, and zero biased in a power-off state for allowing tuning said UHF tuner to a UHF channel, said band switching circuit having first and second band switching terminals which are connected to an anode side and a cathode side of said switching diode, respectively, for applying a selected bias voltage to a selected side of said switching diode, a pair of resistors, each resistor of said pair being connected between a respective one of said terminals and ground, and means for selectively applying a DC bias voltage to said first terminal,

said second terminal, and to neither terminal to obtain said conducting, non-conducting, and power-off states of band switching, respectively,

the improvement wherein a transistor has one terminal connected to said first band switching terminal and another terminal connected to said anode side of said switching



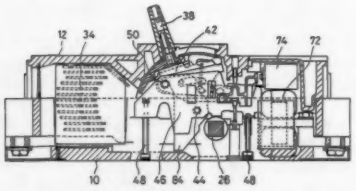
diode such that one PN junction of said transistor is in the opposite bias direction from the PN junction of said switching diode, wherein said band switching circuit does not form a closed loop when said switching diode is zero-biased in the power-off state, whereby interference by harmonics generated by a leakage signal flowing through said switching diode in the power-off state is prevented.

4,710,738

MOULDED CASE CIRCUIT BREAKER

Jean-Philippe Neel, Meylan; Roger Case, Seyssins, and Gilbert Garnier, Fontaine, all of France, assignors to Merlin Gerin, Grenoble, France

Filed Jun. 4, 1986, Ser. No. 870,412
Claims priority, application France, Jun. 12, 1985, 85 09003
Int. Cl.[4] H01H 9/00
U.S. Cl. 335—172 **7 Claims**



1. A moulded case low voltage electrical circuit breaker having stationary and moving contacts assuming three stable positions respectively an open position, a closed position; and a tripped position, said circuit breaker comprising:

at least one stationary contact and one moving contact fitted in said case,

a moving contact support pivotally mounted in said case to bring said contacts respectively into the closed position and the open position,

an operating mechanism, housed in said case, to actuate said support between the open and closed positions of said contacts, said mechanism having a pivoting handle controlling manual opening and closing of the circuit breaker and a frame fixed to said case having a fixed spindle and a latching device,

a hook pivotally mounted on the fixed spindle of said frame and cooperating with the latching device, release of said latching device causing tripping of the circuit breaker,

a toggle-joint comprising an upper rod and a lower rod and a toggle-joint spindle connecting said rods, a free end of the upper rod being articulated by a spindle on the hook and an end of the lower rod being articulated on said support,

a tension spring anchored on the toggle-joint spindle and on the handle to urge the toggle-joint respectively to an extension position, when the handle is in the circuit breaker closed position, and to a broken position when the handle is in the open position, the hook being released by unlocking of the latching device thereby causing the hook and toggle-joint assembly to move to the tripped position of the circuit breaker, and

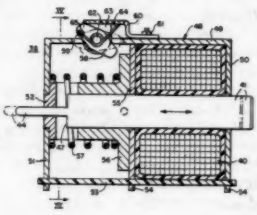
an aperture functioning as a guide means in said hook for cooperating with a catch on the upper rod during tripping operation of the circuit breaker, said tripping operation pivoting said hook to move both said articulated spindle of the upper rod and said catch of the upper rod thereby breaking the toggle-joint and bringing the toggle-joint spindle to a position beyond the dead point of said pivoting handle, said dead point being defined by the alignment of the articulation spindle of the handle, the toggle-joint spindle and the anchoring point of the spring on the handle.

4,710,739

CIRCUIT BREAKER HAVING SHOCK-PROOF TRIP-ACTUATING ASSEMBLY

Carl J. Heyne, Hampton Twp., Allegheny County, and Nicholas A. Tomasic, Plum Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 15, 1986, Ser. No. 885,633
Int. Cl.[4] H01H 9/00
U.S. Cl. 335—174 **7 Claims**



1. In combination with a circuit breaker having a housing of insulating material that contains a pair of contacts one of which is movable into make-circuit and break-circuit relationship with the other contact by a spring-powered operating mechanism that includes a toggle assembly and a latch component,

a trip member pivotally mounted within said housing and adapted to engage and releasably capture said latch component when the operating mechanism is spring-loaded and thereby maintain the operating mechanism and contacts in make-circuit relationship, said trip member being actuable to release said latch component and permit the spring-loaded operating mechanism to rapidly separate the contacts and swing the movable contact to break-circuit position,

means for actuating said trip member and tripping the circuit breaker in response to a current-overload condition, comprising;

an elongated actuator reciprocally movable along a path and through a distance such that the end of said actuator strikes said trip member and releases said latch component when the actuator is moved from a dormant NO-TRIP position to a TRIP position,

means responsive to a current-overload condition for rapidly moving the actuator from NO-TRIP to TRIP position,

means mechanically locking the plunger in dormant NO-TRIP position,

means for releasing said locking means in response to a current-overload condition and in synchronism with the

actuation of the actuator-moving means so that the actuator is automatically motivated and initiates the tripping sequence within a predetermined period of time after the current-overload condition occurs,

the actuator-moving means comprising a solenoid that has a wire coil and a reciprocally-movable magnetic core member and is mounted within the circuit breaker housing adjacent the trip member,

the actuator comprises a longitudinally extending appendage of said solenoid core member,

the actuator-locking means comprises a keeper of magnetic material that is movable into and out of abutting engagement with a laterally-protruding portion of the solenoid core member,

said keeper is mounted in such relationship with the solenoid core member on a yoke of magnetic material that is secured to and provides a chassis for the solenoid core member and wire coil, and

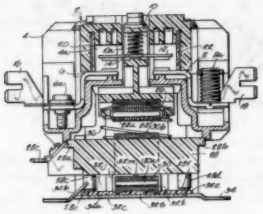
said yoke-chassis being so structured that magnetic flux generated by the energized solenoid is conducted by said yoke to the magnetic keeper and produces a magnetic field that retracts the keeper from abutting engagement with the solenoid core member when the solenoid is energized and thus releases the solenoid core member and actuator from locked NO-TRIP position.

4,710,740

ELECTROMAGNETIC OPERATOR FOR A CONTACTOR WITH IMPROVED SHOCK PAD

William G. Dennison, Cedarburg, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jan. 20, 1987, Ser. No. 4,522
Int. Cl.[4] H01F 7/12
U.S. Cl. 335—248 **10 Claims**



1. An electromagnetic operator for a contactor or the like having a two-part housing, a magnetic armature movably mounted in one part of said housing, a magnetic core having a plurality of pole pieces opposite said armature joined by a yoke portion and positioned in the other part of said housing, a coil encased in plastic molding material to provide a molded coil surrounding one of said pole pieces, and means clamping said two housing parts together whereby one of said housing parts forces the molded coil against the other housing part and supports said magnetic core between said one housing part and said molded coil, characterized by:

a shock pad taking up tolerances and confining said molded coil against movement relative to said housing while allowing limited radial rocking movement of said magnetic core so as to enable said armature to seat fully against said pole pieces upon energization of said coil comprising:

a resilient generally flat portion substantially coextensive with said magnetic core having at its center a shallow resilient spherical segment bump between said magnetic core and said other part of said housing allowing said limited radial rocking movement of said magnetic core;

resilient means extending up from opposite sides of said flat portion and over said yoke portion of said magnetic core between said yoke portion and said molded coil to allow said limited radial rocking movement of said magnetic core relative to said molded coil;

and a plurality of resilient supporting pads extending laterally in opposite directions from said flat portion providing supports between said molded coil and said other part of said housing;

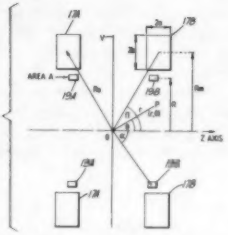
and said molded coil having a plurality of legs pressed against said supporting pads by said clamping means to take up tolerances and to hold said molded coil relatively immovable with respect to said housing while at the same time enabling said clamping means to act through said spherical segment and said magnetic core to apply the desired lesser pressure on said resilient strip means between said coil and said magnetic core to allow said limited radial rocking movement of said magnetic core.

4,710,741

ELECTROMAGNET ARRANGEMENTS FOR PRODUCING A MAGNETIC FIELD OF HIGH HOMOGENITY

John V. M. McGinley, London, England, assignor to Picker International Ltd., Wembley, England

Filed Dec. 3, 1986, Ser. No. 937,215
Claims priority, application United Kingdom, Dec. 9, 1985, 8530295
Int. Cl.[4] H01F 7/06
U.S. Cl. 335—296 **12 Claims**



1. An electromagnet arrangement comprising a single pair of substantially identical annular coils disposed coaxially in spaced relationship, and a pair of annular members of ferromagnetic material disposed coaxially with the coils symmetrically with respect to a plane which perpendicularly intersects the axis of the coils at a position centrally between the coils, the dimensions and relative positions of the coils and rings being such that, with the coils carrying substantially equal currents, at least two of the spherical harmonic field coefficients are substantially eliminated.

4,710,742

ELECTRIC/GAS OVEN THERMOSTAT

Craig M. Cors, Aurora, and Joseph C. Kadlubowski, Willowbrook, both of Ill., assignors to Harper-Wyman Company, Lisle, Ill.

Filed May 29, 1986, Ser. No. 867,932
Int. Cl.[4] H01H 37/12
U.S. Cl. 337—323 **9 Claims**

1. A thermostat for use with an oven of an electric or gas range comprising:

a first electrical contact;

a second electrical contact;

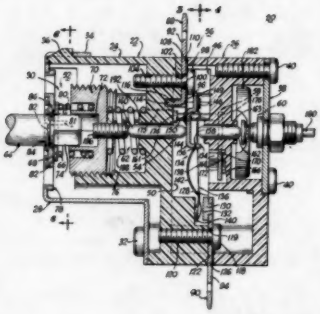
actuating means for opening and closing an electrical path between said first and second electrical contacts, said actuating means including a spring arm having a fixed end coupled to said first electrical contact and a free end moved between a contacting position and a noncontacting position with said second electrical contact;

manually operable means movable to an OFF position and to

a plurality of ON positions for selecting an oven operating temperature;

said spring arm being operatively coupled to said manually operable means for moving from the noncontacting position to the contacting position with said second electrical contact when said manually operable means is moved from the OFF position;

temperature responsive means movable in response to changes in oven temperature;



said spring arm being operatively coupled to said temperature responsive means for moving from and to the contacting position upon increases and decreases in the oven temperature relative to the selected oven operating temperature; and

calibration means separately arranged and spaced from said manually operable means and being operatively coupled to said actuating means to determining the position of said actuating means relative to said temperature responsive means.

4,710,743

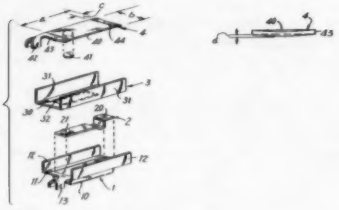
THERMOSTATIC DEVICE WITH LEAK TIGHT CASING

Omar R. Givler, North Canton, Ohio, assignor to Portage Electric Products, Inc., North Canton, Ohio

Continuation-in-part of Ser. No. 804,492, Dec. 4, 1985, abandoned. This application Dec. 16, 1986, Ser. No. 942,621

Int. Cl.[4] H01H *37/04, 37/52*

U.S. Cl. 337—380 **4 Claims**



1. In a thermostatic device having a cup-shaped base, said base being provided with a ledge around the opening of the cup in said cup-shaped base; and insulating member adapted to lie against the ledge provided on said base; and a lid to lie above the insulating member; means being provided on said ledge for crimping said base, said insulating member, and said lid together, said lid being crimped to said ledge of said base, through said insulating member, by action of said means on said ledge for crimping said base, said insulating member, and said lid together; the improvement which comprises a stepped-down area in said lid, only the center of said stepped-down area lying against said insulating member prior to crimping said base, said insulating member, and said lid together.

4,710,744

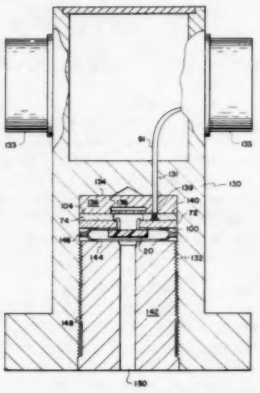
PRESSURE TRANSDUCER PACKAGE

David B. Wamstad, Roseville, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 8, 1985, Ser. No. 721,105

Int. Cl.[4] G01L *1/22*

U.S. Cl. 338—4 **19 Claims**



1. A pressure transducer unit, the unit comprising:

a housing having a chamber located within the housing bounded by surfaces within the housing except for an aperature in the housing which permits access to the chamber from outside the housing, the housing comprising a body with an interior opening as a basis for the chamber, a first end of the chamber being a surface within the body, and further comprising a plug means plugging part of the opening for hermetically sealing the chamber except at the aperature, the plug means having a surface forming a second end of the chamber;

a pressure transducer comprising a pressure sensing die mounted on a support member, the support member having first and second end surfaces, the pressure transducer located in the chamber;

an interface plate having first and second end surfaces, the first end surface of the interface plate adjacent the first end of the chamber, the second end surface of the interface plate adjacent the first support member end surface; and

a compressive ring located between the second support member end surface and the surface of the plug means whereby the interface plate, support member, and compressive ring together are compressed between the first end and the second end of the chamber.

4,710,745

VEHICLE WARNING SYSTEM

Luis del Rosario, 1636 N. Verdugo Rd., Apt. #304, Glendale, Calif. 91208

Filed Aug. 24, 1982, Ser. No. 410,940

Int. Cl.[4] B60R *25/00, 25/04;* **B60Q** *1/46*

U.S. Cl. 340—63 **7 Claims**

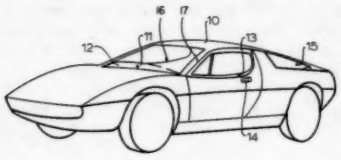
1. An electrical indicator for unattended vehicles including a battery and an ignition switch for starting the vehicle comprising at least one lighted indicator located at a position on a vehicle where it is visible from the exterior of the vehicle by one attempting an unauthorized entry of the vehicle;

means for applying power from the battery of the vehicle to cause said indicator to be visibly active; and

relay means including back contacts for coupling said power

applying means to the battery of the vehicle and to the ignition swith of the vehicle;

said relay means being operative to disable said power applying means when the ignition switch of the vehicle is ON by opening said back contacts whereby said indicator is operative when the vehicle ignition switch is in an OFF



position and enabling said power applying means via said back contacts of said relay means when said relay means is not operated and is not drawing current;

said electrical indicator being characterized by the absence of any switch required to be operated by the user to make the indicator visibly active or disabled other than the normal usage of the ignition switch.

4,710,746

SEQUENTIAL DECODING DEVICE FOR DECODING SYSTEMATIC CODE

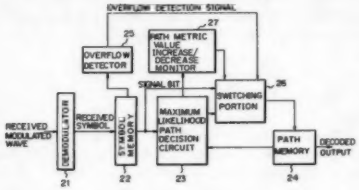
Kaneyasu Shimoda; Tadayoshi Katoh, both of Kawasaki, and Yuzo Ageno, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 6, 1987, Ser. No. 11,537

Claims priority, application Japan, Feb. 7, 1986, 61-023972

Int. Cl.[4] H03M *13/12*

U.S. Cl. 340—347 DD **1 Claim**



1. A sequential decoding device for decoding a data expressed by the systematic code having a symbol memory, a maximum likelihood path decision circuit, and a path memory, said device comprising:

an overflow detection circuit for detecting an overflow of said symbol memory;

switching means for supplying signal bit data, as an decoded output, read from said symbol memory directly to said path memory in correspondence with an overflow detection signal from said overflow detection circuit; and

a path metric value increase/decrease monitoring circuit for monitoring the increase/decrease of a path metric value delivered from said maximum likelihood path decision circuit and controlling said switching means in such manner that, when a monotonous increase of said path metric value is detected, the decoded output of said maximum likelihood path decision circuit is supplied to said path memory, instead of the direct supply of said decoded output of said symbol memory to said path memory.

4,710,747

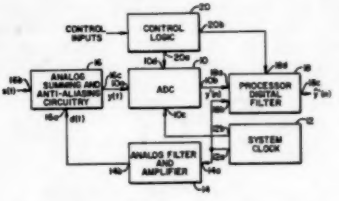
METHOD AND APPARATUS FOR IMPROVING THE ACCURACY AND RESOLUTION OF AN ANALOG-TO-DIGITAL CONVERTER (ADC)

Alex Holland, Mountain View, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.

Continuation-in-part of Ser. No. 586,902, Mar. 9, 1984, abandoned. This application May 7, 1985, Ser. No. 731,683

Int. Cl.[4] H03M *1/20*

U.S. Cl. 340—347 AD **11 Claims**



6. A system for generating a digital representation of an analog test signal, s(t), comprising:

an analog to digital converter (ADC) for generating an analog ADC input signal, y(t), with said ADC characterized by a given input dynamic range;

means for generating a known dither signal, d(t); where said dither signal is rapidly varying with respect to said test signal and where the amplitude of d(t) substantially covers the given dynamic range of said ADC;

means for adding d(t) to s(t) to form said analog ADC input signal, y(t); and

means for digitally filtering said m-bit digital signal to attenuate said dither signal.

4,710,748

METHOD AND DEVICE FOR CONVERTING AN ANALOG SIGNAL INTO A PULSE SIGNAL

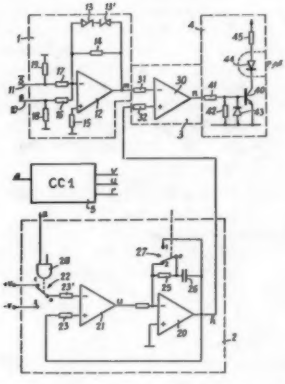
Louis Champavier, Mouans Sartoux, France, assignor to Vita Center Inc., Panama, Panama

Filed Oct. 18, 1984, Ser. No. 662,261

Claims priority, application France, Jan. 16, 1984, 84 01076

Int. Cl.[4] H03K *13/00*

U.S. Cl. 340—347 AD **29 Claims**



1. A transmission system for transmitting an analog signal in closed loop including on its direct loop:

a summing device, substracting the transmitted signal from the signal to be transmitted,

a first direct conversion device on the input of which the output signal from the summing device is applied, com-

prising first function generating means for generating a first standard signal, comparison means for comparing said analog signal to said first standard signal, emitting means for emitting a pulse when the comparison means detects the equality between the analog signal and said first standard signal;

a first reverse conversion device comprising receiving means for receiving the pulses from said first direct conversion device, second function generating means for generating a second standard signal, means for synchronizing said second standard signal with said first standard signal, and means for memorizing the value reached by said second standard signal upon reception of a pulse;

means for coupling the output from the first direct conversion device to the input of the first reverse conversion device; and

means for feeding the output from the first reverse conversion device back onto itself.

4,710,749

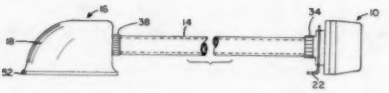
SIREN WITH REMOTE DRIVER

Howard M. Berke, Madison, and Harold W. Lyons, Deep River, both of Conn., assignors to Whelen Engineering Co., Inc., Chester, Conn.

Continuation of Ser. No. 648,538, Sep. 10, 1984, abandoned. This application Dec. 29, 1986, Ser. No. 946,681

Int. Cl.[4] G08B *3/00*; G10K *7/00*

U.S. Cl. 340—405 **10 Claims**



1. A siren comprising:

a sound wave generator, said sound wave generator being responsive to an alternating electrical signal and including a movable diaphragm, said sound wave generator further including a passage which converges to a throat, said passage having an exit end through which sound produced by movement of said diaphragm exits said generator;

speaker means including a horn from which sonic energy delivered to said speaker means is radiated, said horn defining a radiation pattern;

a sound pipe capable of flexing in any direction without kinking, said sound pipe having a substantially uniform inner diameter with a smooth inner surface, and first and second oppositely disposed ends; and

first and second adapter means for acoustically coupling the first and second ends of said sound pipe respectively to said generator and speaker means.

4,710,750

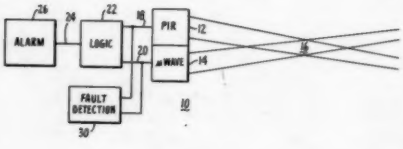
FAULT DETECTING INTRUSION DETECTION DEVICE

Richard A. Johnson, Pleasanton, Calif., assignor to C & K Systems, Inc., San Jose, Calif.

Filed Aug. 5, 1986, Ser. No. 893,399

Int. Cl.[4] G08B *19/00, 23/00*

U.S. Cl. 340—522 **6 Claims**



1. In an intrusion detection apparatus of the type having dual sensing means, a first sensing means for generating a first output signal in response to the detection of an intruder, a second sensing means for generating a second output signal in response to the detection of an intruder, and logic means for receiving said first and said second output signals and for generating an alarm in response thereto, wherein the improvement comprising:

first means for storing the number of first output signals received from said first sensing means;

second means for storing the number of second output signals received from said second sensing means; and

logic means for comparing the number of first output signals from said first storing means and the number of second output signals from said second storing means and for generating an output signal indicative of fault in said apparatus, in response to said comparison.

4,710,751

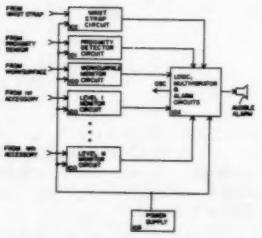
GROUND FAULT MONITOR CIRCUIT

James B. Webster, Santa Ana, Calif., assignor to Environmental Protection Systems, Irvine, Calif.

Filed Apr. 24, 1986, Ser. No. 855,400

Int. Cl.[4] G08B *19/60*

U.S. Cl. 340—522 **29 Claims**



1. A fault monitoring system comprising,

a wrist strap monitoring circuit connected to monitor the grounded status of an operator at a workstation;

a proximity monitoring circuit connected to monitor the presence status of a person in proximity to said workstation;

at least one surface monitoring circuit connected to monitor the grounded status of a surface related to said workstation;

logic circuit means connected to each of said wrist strap monitoring circuit, said proximity monitoring circuit and said at least one surface monitoring circuit to receive signals therefrom which signals are representative of the status monitored by the respective monitoring circuit; and

alarm means connected to be selectively activated by said logic circuit means when one or more of said monitoring circuits produces a signal indicative of a prescribed status condition thereat.

4,710,752

APPARATUS AND METHOD FOR DETECTING A MAGNETIC MARKER

Robert A. Cordery, Danbury, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Aug. 8, 1986, Ser. No. 894,429

Int. Cl.[4] G08B *13/24*

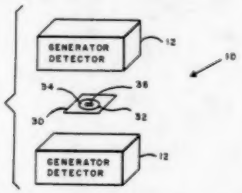
U.S. Cl. 340—551 **32 Claims**

1. A system for detecting the presence of a ferromagnetic marker in an interrogation zone, comprising:

first generating means for generating a first magnetic field in the interrogation zone at a first frequency,

second generating means for generating a second magnetic field in the interrogation zone at a second frequency,

said second frequency having a value less than approximately one-fifth of said first frequency and



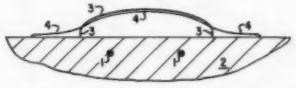
means for detecting amplitude modulated signals produced by a magnetic marker present in the interrogation zone when said first and second magnetic field generating means are enabled.

4,710,753

SECURITY SYSTEM TRANSMISSION LINE

Brian G. Rich, Nepean; John W. Patchell, Carleton Place, and R. Keith Harman, Kanata, all of Canada, assignors to Senstar Security Systems Corporation, Ontario, Canada

Filed Feb. 8, 1985, Ser. No. 699,742
Claims priority, application Canada, Mar. 22, 1984, 450243
Int. Cl.[4] G08B *13/26*
U.S. Cl. 340—561 **36 Claims**



1. A leaky cable intrusion detection system comprising a pair of spaced, parallel, buried, leaky coaxical cables, means for applying a radio frequency signal to one of the cables, whereby an electromagnetic field outside said one cable is established, means for receiving a radio frequency signal from the field from the other of the cables whereby disturbances in said field can be detected, the cables being spaced apart a distance such that they are intermediately coupled, being coupled to a greater degree than loosely coupled and to a lesser degree than tightly coupled, wherein the cables are buried in a subsoil material of varying conductivity and dielectric constant, a longitudinal shield buried with the cables located along, below and spaced from the cables, the distance between the cables and the shield below the cables decreasing with decreasing conductivity and/or dielectric constant of said material, and increasing with increasing conductivity and/or dielectric constant said material, whereby variations in said electromagnetic field which may be caused by at least said varying conductivity and dielectric constant, are substantially reduced.

4,710,754

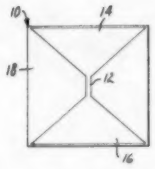
MAGNETIC MARKER HAVING SWITCHING SECTION FOR USE IN ELECTRONIC ARTICLE SURVEILLANCE SYSTEMS

Samuel Montean, Blaine, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 19, 1986, Ser. No. 909,340
Int. Cl.[4] G08B *13/18*
U.S. Cl. 340—572 **28 Claims**

1. A marker adapted for use in an electronic article surveillance system said marker having a substantially sheet-like configuration and comprising a magnetic construction having at least one switching section and flux collectors proximate to each end of each switching section, wherein said construction comprises pieces of magnetic material in which the overall length and width respectively are not greater than 3.2 cm and

(a) wherein each of said switching sections
(i) is formed of a piece of low coercive force, high permeability material;
(ii) has a minimum width at which the cross-sectional area is in the range of 0.003–0.03 mm^2, and
(iii) has a length normal to the minimum width not greater than twenty times that width and less than 2.0 cm, the terminal ends of said length being further defined by



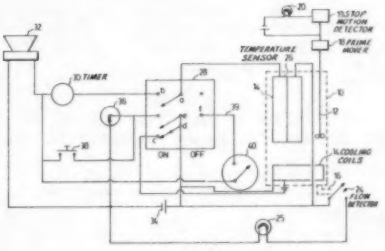
points at which the width parallel to said minimum width is no longer less than five times the minimum width, and
(b) wherein each of said flux collectors
(i) is formed of co-planar sections of sheet-like material having a low coercive force and high permeability, and
(ii) has a width not less than ten times the minimum width of any switching section.

4,710,755

ALARM FOR MILK COOLER

Robert A. Gurney, R.R.#7, Brighton, Ontario, Canada K0K 1H0

Filed May 12, 1986, Ser. No. 861,972
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—585 **11 Claims**



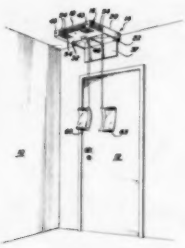
1. A temperature warning device for use in conjunction with a milking machine and a cooler in which the milking machine causes milk to flow from one or more cows to the cooler where the temperature of the milk is cooled to a predetermined value, said warning device comprising: temperature sensor means responsive to the temperature of milk within the cooler; alarm means activated by said sensor means when the temperature of the milk within the cooler is above a predetermined value; means for selectively deactivating said alarm means; and warning means responsive to activation of said milking machine and to de-activation of said alarm means for warning of de-activation of said alarm means.

4,710,756

COMBINATION SMOKE DETECTOR AND DEVICE FOR CONTAINING AIR

Dennis D. Thornburg, 6035 Alfredo Ave., Chino, Calif. 91710, and Richard R. Parenteau, 23542 Belmar, Laguna Niguel, Calif. 92677

Filed Jan. 7, 1985, Ser. No. 689,068
Int. Cl.[4] G08B *17/10*
U.S. Cl. 340—628 **9 Claims**



1. A smoke detector in combination with a bag for containing ambient air, comprising:

a housing adapted to be mounted to a ceiling or a wall of a room adjacent the exit door;

a smoke-detector unit mounted within said housing to detect smoke within said room;

said housing having at least one storage compartment;

a hinged panel covering said storage compartment;

an air bag folded and stored in said storage compartment; and

releasable latching means adapted to release said hinged panel to an open position, whereby said air bag for containing ambient air is freed from said storage chamber when said smoke detector is activated;

wherein said bag defines an air chamber having an opening therein, whereby the head of the wearer is received in said chamber, and wherein said air bag includes means for securing said bag to said wearer's body;

wherein said securing means comprises a pair of tie-down straps secured at one end to opposite sides of said air bag, the free ends thereof being tied about the body of said wearer when in use;

and wherein said air bag includes means for attaching one of said tie-down straps to said storage compartment, so as to allow said bag to drop down and hang from said storage compartment, wherein the wearer thereof can remove said bag from said housing.

4,710,757

PLANTER MONITOR SYSTEM

Wayne C. Haase, 2764 Doverton Sq., Mountain View, Calif. 94040

Filed Feb. 14, 1984, Ser. No. 580,108
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—684 **12 Claims**

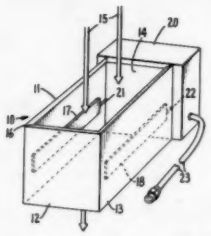
1. A system for monitoring small discrete particles having a high dielectric constant, such as seeds, that pass along a path, comprising

a sensor having at least one transmitter and one receiver electrode means spaced from one another and electrically exposed to said path passing between them;

transmitter circuit means applying to said transmitter electrode means a constant electrical signal to produce an electrical sensing field between said electrode means transverse to said path;

receiver circuit means detecting a change in electrical energy received by said receiver electrode means from said transmitter electrode means in response to a particle passing on said path in proximity to said electrode means; and

a grounded conductive shield extending further along said path than the electrode means sufficiently for both isolating said electrode means from the external environment



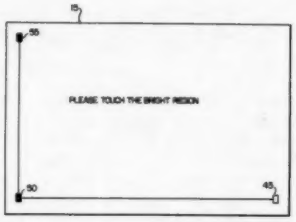
and for confining said transverse electric sensing field to a short length of said path between electrodes.

4,710,758

AUTOMATIC TOUCH SCREEN CALIBRATION METHOD

James M. Mussler, Bethel Park, and Mark E. Swartz, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 26, 1985, Ser. No. 727,966
Int. Cl.[4] G09G *3/00*
U.S. Cl. 340—712 **17 Claims**



1. An automatic calibration method for a touch screen used in conjuction with a display during interactive sessions, where the touch screen and the display have first and second sets of axes and the first and second sets of axes are asumed to substantially overlay, respectively, said method comprising the steps of:

(a) displaying, prior to each of the interactlve sessions, a first point on the display;

(b) obtaining first coordinates of a first touch on the touch screen at approximately the first point; and

(c) generating terms in a translation matrix for translating coordinates of the first touch into coordinates.

4,710,759

INTERACTIVE CRT WITH TOUCH LEVEL SET

James Fitzgibbon, Lombard, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Continuation of Ser. No. 582,505, Feb. 22, 1984, abandoned. This application Apr. 13, 1987, Ser. No. 37,079
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—712 **5 Claims**

1. In a touch control panel having a plurality of crossing energy paths and means for repetitively testing the energy levels in said paths against stored test levels for said paths to determine if an interruption, corresponding to a touch, has occurred, a method of updating the stored test levels for said paths comprising the steps of:

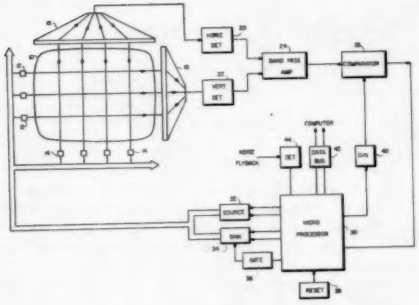
energizing each of said paths in sequence;

comparing the detected energy level in each of said paths with a nominal threshold level;

A. (1) if the test indicates energy is detected, testing again with a maximum threshold level;

(2) if at a maximum energy level, storing the maximum threshold level as the updated test level for that energy path;

(3) if not at a maximum energy level, increasing the nominal threshold level and testing again;



(4) continuing testing and increasing the threshold level until no energy is detected, and storing the last threshold level as the updated test level for that path;

B. (1) if the test indicates no energy detected, testing for a minimum threshold level;

(2) if at a minimum threshold level, storing the minimum threshold level as the updated test level for that path;

(3) if the threshold level is not at a minimum, decreasing the threshold level by a predetermined amount; and

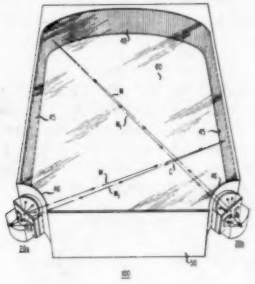
(4) storing the decreased threshold level as the updated test level for that path.

4,710,760

PHOTOELASTIC TOUCH-SENSITIVE SCREEN

Leonard R. Kasday, East Windsor, N.J., assignor to American Telephone and Telegraph Company, AT&T Information Systems Inc., Murray Hill, N.J.

Filed Mar. 7, 1985, Ser. No. 709,554
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—712 **20 Claims**



1. A touch-sensitive device comprising

a screen,

means for generating and directing polarized signals having at least a predetermined polarization into said screen, said screen causing changes in the polarization of ones of said polarized signals which pass through a point on said screen at which a force is applied, and

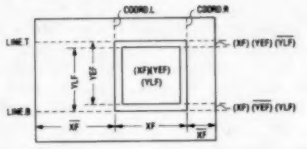
means responsive to said ones of said signals having changes in said polarization for determining the location of said point at which said force is applied on said screen.

4,710,761

WINDOW BORDER GENERATION IN A BITMAPPED GRAPHICS WORKSTATION

Rajan N. Kapur, Summit, and Edward S. Szurkowski, Maplewood, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 9, 1985, Ser. No. 753,270
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—721 **15 Claims**



1. A bitmapped graphics workstation comprising

a host processor,

a visual output display device having a raster scanned display screen,

means for defining a plurality of independent window areas on the screen,

a plurality of bitmap memories each having contiguous storage words addressable by the host processor for storing display data associated with a different said window,

means responsive to the window defining means for identifying when the screen raster enters and exits one of the windows,

means activated by the identifying means for retrieving display data from one of the bitmap memories associated with the one window,

means for transmitting the retrieved display data to the display device in synchronism with the raster, and

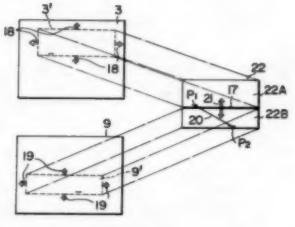
means responsive to the detection of entry and exit of the raster in the window by the identifying means for substituting for a predetermined number of the data signals from the one bitmap signals of a predetermined state for generating the window border.

4,710,762

DISPLAY SCREEN CONTROL SYSTEM

Kimitoshi Yamada, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 22, 1983, Ser. No. 554,333
Claims priority, application Japan, Nov. 22, 1982, 57-203623
Int. Cl.[4] G06K *15/20*
U.S. Cl. 340—721 **3 Claims**



1. A display screen control system

capable of carrying out simultaneously a plurality of functions of a terminal connected to a central processing unit, said system comprising:

first memory means for storing data to be processed by a first function;

second memory means for storing data to be processed by a second function;

third memory means for storing parameters which specify a first data area which has a part of the data stored in said first memory means, a second data area which has a part of the data stored in said second memory means, and boundary information for the display of said data;

input means operated by an operator for inputting data and commands for changing the contents of said third memory means;

control means for changing the contents of said third memory means in response to commands from said input means;

a single display device having a display screen for displaying data; and

display control means for taking out the data of said first and second data areas from said first and second memory means and for supplying said data to said single display device for simultaneous display in first and second fields on said display screen in accordance with the parameters in said third memory means;

wherein data which corresponds to a plurality of different works are displayed simultaneously on respective areas of the same display screen; and wherein said input means includes a keyboard having an alteration key for designating alteration of the boundary between said first field and said second field, and said control means comprises means for altering the parameters in said third memory means, when said alteration key is actuated, to shift the boundary of said first field and said second field on the display screen of said display device.

4,710,763

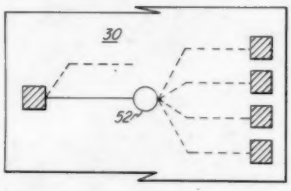
METHOD FOR GENERATING AND DISPLAYING TREE STRUCTURES IN A LIMITED DISPLAY AREA

David W. Franke, and Carroll R. Hall, both of Austin, Tex., assignors to Texas Instruments Incorporated

Filed Oct. 19, 1984, Ser. No. 663,005

Int. Cl.[4] G09G 1/14

U.S. Cl. 340—723 **22 Claims**



1. A method for providing a display of a tree structure which includes a plurality of nodes interconnected by tree branches, said method comprising the steps of:

(a) selecting a portion of said tree structure to be displayed,

(b) scaling the geometry of said portion in a manner different than that which would be used if the entire tree were to be displayed, and

(c) displaying the scaled portion on a medium suitable for interpretation.

4,710,764

DEVICE FOR OBTAINING CONTINUOUS PLOTS ON THE SCREEN OF A DISPLAY CONSOLE CONTROLLED BY A GRAPHIC PROCESSOR

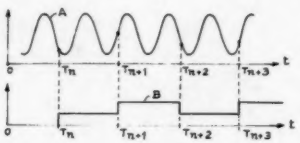
Luc P. Van Cang, Savigny Sur Orge, France, assignor to Thomson Video Equipment, Gennevilliers, France

Filed Apr. 15, 1985, Ser. No. 723,276

Claims priority, application France, Apr. 17, 1984, 8406053

Int. Cl.[4] G09G 1/16

U.S. Cl. 340—728 **7 Claims**



1. A device for obtaining a continuous line between points on a plot on a screen of a graphic image television display controlled by a graphic processor, the points being ordered in the form of a matrix of fixed points on the screen said device comprising:

a graphic memory for storing all the points of the plot in binary form

an attribute memory for containing the attributes of each of the points

an interpolation circuit controlled by the graphic processor from instructions fed into the processor from a keyboard for entering a value PN of the attributes of consecutive points on the plot on either side of the point to be modified, said interpolation circuit comprising a memory for storing a table for calculating the attributes of the intermediate points between consecutive points of the plot the table of the interpolation circuit being addressed at a first input by the pre existing attribute PA of the point to be modified found in the attribute memory, at a second input by the said value PN and at a third input by an interpolation value F equal to the fractional part of the position of the intermediate point to be modified between said consecutive points on the plot, each position of the table containing an attribute value PM confirming the relationship

$$PM=F.PA+(1-F).PN$$

the value PM obtained being transferred into the attribute memory for updating the contents of the position corresponding to the address of the modified point.

4,710,765

LUMINESCENT DISPLAY DEVICE

Akio Ohkoshi, Tokyo; Koji Tsuruta, Kanagawa; Hideaki Nakagawa, Tokyo, and Satoshi Shimada, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 30, 1984, Ser. No. 635,608

Claims priority, application Japan, Jul. 30, 1983, 58-140141; Jul. 30, 1983, 58-140143

Int. Cl.[4] G09G 3/00

U.S. Cl. 340—781 **11 Claims**

1. A luminescent display device, comprising:

a glass envelope having front panel, side wall and rear plate;

a plurality of luminescent segments formed on an inner surface of the front panel with a conductive layer coated thereon and positioned to form red, green, and blue displays in a line;

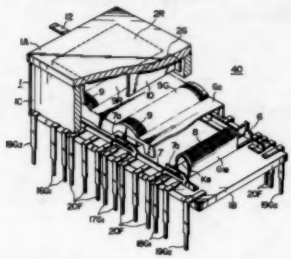
a separator electrode formed of partitions extending from said front panel inner surface towards said rear plate and forming a frame around each segment;

a respective cathode adjacent to the rear panel for each of the luminescent segments;

a respective control grid electrode arranged between a respective segment and a respective cathode for each respective cathode and segment;

a common accelerating electrode arranged between said segments and said control grid electrodes; and

the control grid electrodes, common accelerating electrode, luminescent segment, and cathodes being positioned and



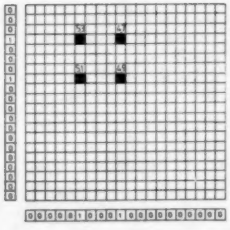
dimensioned such that with an anode voltage applied to the separator electrode and said segments, a voltage applied to the accelerating electrode, and a voltage selectively applied to one or more of said control grid electrodes, electron emission from the respective cathodes is controlled so that the respective segment is selectively luminescent for display.

4,710,766

DEVICE FOR DISPLAYING SYMBOLS BY MEANS OF A LIQUID CRYSTAL MATRIX

Marcel Dubois, Paris, and Pierre Fagard, Montigny le Bretonneux, both of France, assignors to Societe Francaise d'Equipements pour la Navigation Aerienne, Velizy Villacoublay, France

Filed Aug. 21, 1984, Ser. No. 642,815
Claims priority, application France, Aug. 25, 1983, 83 13698
Int. Cl.[4] G09G *3/36*
U.S. Cl. 340—784 **9 Claims**



1. A device for displaying symbols forming a complete image on a liquid crystal display having a matrix formed from a plurality of lines and a plurality of columns, the device comprising:

a computer having a random access memory for storing and developing in succession a plurality of elementary images derived from the complete image, each of said elementary images being represented by a first assembly of bits equal in number to the number of lines of the matrix, each of said bits in said first assembly having either a first value or a second value and being associated with a different one of the lines of the matrix, and a second assembly of bits equal in number to the number of columns of the matrix, each of said bits in said second assembly having either said first value or said second value and being associated with a different one of the columns of the matrix at least one of said subimages having at least two bits in each said first and second assemblies of bits of each said first value and said second value;

means for refreshing said random access memory during successive periods; and

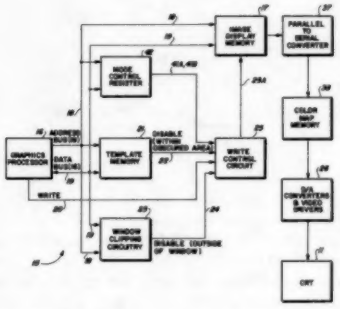
a control circuit connected to said random access memory and to the lines and columns of the matrix for receiving in succession from said random access memory said first assembly of bits and said second assembly of bits corresponding to each of said elementary images and for simultaneously applying to each of the lines of the liquid crystal display either a first voltage level or a second voltage level in accordance with said associated bits in said received first assembly of bits having said first value or said second value, respectively, and to each of the columns of the liquid crystal display either a third voltage level or a fourth voltage level in accordance with said associated bits in said received second assembly of bits having said first value or said second value, respectively, to control the liquid crystal display to display the complete image as a result of the successive display of the elementary images derived therefrom.

4,710,767

METHOD AND APPARATUS FOR DISPLAYING MULTIPLE IMAGES IN OVERLAPPING WINDOWS

James R. Sciacero, Scottsdale, and Douglas L. Pardee, Mesa, both of Ariz., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Jul. 19, 1985, Ser. No. 757,126
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—799 **34 Claims**



1. A display system including a display screen and an image memory, the display system comprising in combination:

(a) first means for determining the addresses of pixels of a first group that are located within a first window of the display screen area, within which first window a portion of a first image is to be displayed, and second means for determining the addresses of pixels of a second group that are located within a second window of the display screen area, within which second window a portion of a second image of higher priority than the first image is to be displayed, the second window obscuring an area of the first window;

(b) means for storing a bit mask, the bit mask constituting a plurality of bits that are respectively addressable by a plurality of the addresses of pixels of the first group;

(c) means for writing the bits of the bit mask into locations of the bit mask storing mans defined by the addresses of the pixels of the first group;

(d) means for transmitting pixel data and pixel addresses of pixels of the first group to the image memory, and concurrently transmitting those pixel addresses to the bit mask storing means;

(e) means for outputting a bit signal from the bit mask storing means in response to the address presently being transmitted to produce a first write disable signal if the pixel bears a predetermined relationship to the first group and the obscured area; and

(f) means for disabling the pixel from being written into the image memory in response to the first write disable signal.

4,710,768

LIQUID CRYSTAL DISPLAY WITH SWITCHING TRANSISTOR FOR EACH PIXEL

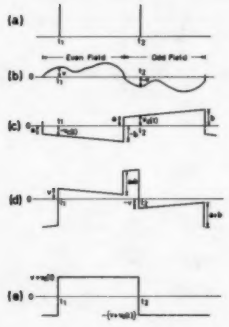
Makoto Takeda, Tenri; Keisaku Nonomura, Nara, and Kunihiko Yamamoto, Kitakatsuragi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 11, 1984, Ser. No. 660,005

Claims priority, application Japan, Oct. 13, 1983, 58-192076

Int. Cl.⁴ G09G *3/00*

U.S. Cl. 340—805 **3 Claims**



1. A liquid crystal display device comprising:

a liquid crystal display including,

row and column electrodes formed as a matrix array on a first substrate,

a switching transistor formed at the intersection of each said row and column electrode,

a display picture element electrode connected to each said switching transistor defining a display element,

an opposed electrode formed on a second substrate at a position opposite from each said display picture element electrode, and

a liquid crystal layer disposed between said display picture element electrodes and said opposed electrodes; and

signal processing means connected to said liquid crystal display for providing a video signal, having fields of alternating positive/negative polarity to said column electrodes and for sequentially applying scan pulses to said row electrodes; and

opposed electrode signal generator means for applying an alternating predetermined voltage in synchronism with the fields of alternating polarity of said video signal but of opposite voltage polarity thereto to said opposed electrodes to produce a sum voltage of said video signal and said alternating predetermined voltage across each said display element, said sum voltage applied to each said display element having a voltage greater than either said video signal supplied to that said display element or said alternating predetermined voltage.

4,710,769

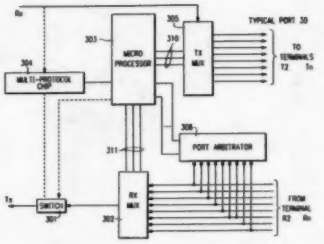
TRANSMIT-SECURE NON-BLOCKING CIRCUIT-SWITCHED LOCAL AREA NETWORK

Lee G. Friedman, Croton-on-Hudson; Brent T. Hailpern, Katonah; Lee W. Hoevel, Yorktown Heights, and Yannick J. Thefaine, Beacon, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 30, 1985, Ser. No. 815,358

Int. Cl.⁴ H04Q *11/04*

U.S. Cl. 340—825.030 **9 Claims**



1. A non-blocking, transmit secure switching system for connecting any one of a plurality of n transceivers to any other of said plurality of transceivers, wheren is an integer greater than 1,

a plurality of dedicated bus lines, a different pair of dedicated bus lines for each different pair of said transceivers,

a port associated with each transceiver, each port including 2(n−1) terminals, each coupled to a different one of said bus lines, and

each port further including switching means for connecting said associated transceiver with at least a selected one of said terminals.

4,710,770

PHASE MODULATION TYPE DIGITAL POSITION DETECTOR

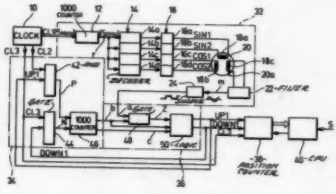
Yoshitami Hakata; Masanori Wakuda, and Kimio Suzuki, all of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 22, 1984, Ser. No. 592,296

Claims priority, application Japan, Mar. 24, 1983, 58-49283; Dec. 22, 1983, 58-242859

Int. Cl.⁴ G08C *19/12*

U.S. Cl. 340—870.18 **56 Claims**



1. An apparatus for determining a physical quantity, comprising:

first means for generating a first signal the phase of which is modulated corresponding to a variation of said physical quantity;

second means for generating a second signal the phase of which follows that of said first signal;

third means for generating a third signal corresponding to the time intervals during which differences in phase exist between the first and the second signal; and

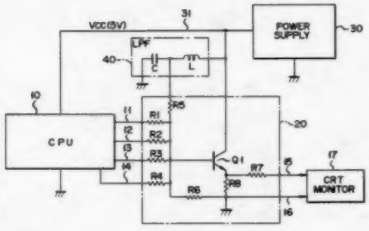
fourth means comprising storing means for storing said third

signal in accumulation, said second means controlling, in response to said third signal, the degree by which the second signal follows the first signal.

4,710,771
COMPUTER IMAGE DISPLAY APPARATUS

Haruhiko Banno, and Shigeo Yatagai, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 14, 1984, Ser. No. 620,485
Claims priority, application Japan, Jun. 22, 1983, 58-112162
Int. Cl.[4] G09G *1/14*
U.S. Cl. 340—811 **4 Claims**

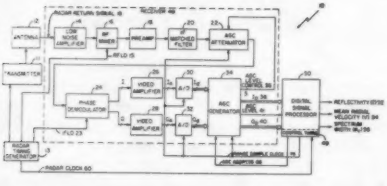


1. A computer image display apparatus comprising:
processing means for performing predetermined digital processing of data;
displaying means, compatible with said processing means, for displaying data processed by said processing means;
a composite video interface for generating horizontal and vertical synchronizing signals;
power supply means for providing electric power to said processing means and said composite video interface;
a power supply line interconnecting said power supply means to said processing means and to said composite video interface for conducting said electrical power from said power supply means to said processing means and said composite video interface; and
filter means, operatively disposed in said power supply line between said power supply means and said composite video interface, for eliminating switching noise in said electric power at approximately the same frequency as the frequency of said horizontal synchronizing signal, said electric power causing said composite video interface to be electrically energized, thereby preventing said switching noise from being displayed on said displaying means.

4,710,772
LOG MAGNITUDE PULSE INTERFERENCE DETECTION FOR A RADAR SYSTEM

Robert H. Cantwell, Sudbury; William K. Marksteiner, Boston, and V. Gregers Hansen, Framingham, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Dec. 5, 1985, Ser. No. 804,946
Int. Cl.[4] G01S *7/34*
U.S. Cl. 342—92 **27 Claims**

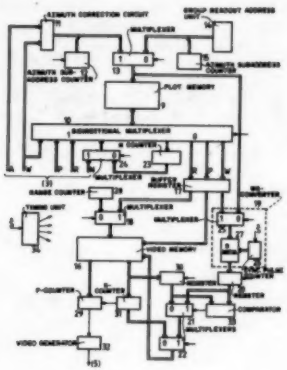


1. In a radar system wherein received signals having amplitudes which may vary within a wide range of possible amplitudes are processed using automatic gain control (AGC), a pulse interference detection apparatus comprising:
means for converting a fixed point data representation of an in-phase (I) component and a quadrature (Q) component for each of said received signals to a floating point data representation having a mantissa and an exponent, said mantissa having at least one or more bits based on desired accuracy;
means coupled to said converting means and in response to an AGC level word for generating a log magnitude value for each of said received signals; and
means coupled to said log magnitude generating means for detecting a pulse of interference to one of said received signals in a sweep N−1 at range M based on an examination of said log magnitude value of adjacent sweeps N and N−2 at said range M.

4,710,773
DATA CONVERTER FOR A PULSE RADAR APPARATUS

Jouke Gietema, and Bernard H. M. Oude Elberink, both of Oldenzaal, Netherlands, assignors to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Continuation of Ser. No. 508,219, Jun. 27, 1983. This application Mar. 6, 1987, Ser. No. 22,503
Claims priority, application Netherlands, Jul. 9, 1982, 8202784
Int. Cl.[4] G01S *13/72*
U.S. Cl. 342—185 **8 Claims**



1. A data converter for a pulse radar apparatus including:
(a) a transmitter/receiver unit for producing video signals representing target information received by an antenna;
(b) video processing means electrically connected to the transmitter/receiver unit and including a video extractor for deriving digitized target plotting data from the video signals, and a plot processor for deriving track positions A, R indicative of the target centroid azimuth position and the target range, respectively, and associated digital data N indicative of the number of antenna revolutions for which the track of a target is to be displayed from the plotting data obtained from consecutive antenna revolutions; and
(c) a display system electrically connected to the transmitter/receiver unit and to the video processing means for displaying both the video signals and the track positions and associated digital data;
said data converter comprising an output electrically connected to the display system, input means electrically connected to the video processing means for receiving said track positions and associated digital data, a first memory, a second memory, address means for effecting writing of the data received at said input means into and

reading said data from said memories, and timing means for controlling operation of the address means, said address means effecting application of data from the second memory to the display system in such an order that the track followed within said predetermined number of antenna revolutions by a target displayed in real time is simultaneously displayed in synchronism with the radar sweeps;

said data converter being characterized in that:

the input means is adapted to receive from the video processing means digital data indicative of the width W of a target and the length P of a received echo pulse,

the address means comprises:

(i) first address means arranged to effect the storage of the quantities R, P, W and N in the first memory locations depending on the azimuth values $A-\frac{1}{2}W$ associated with said data;

(ii) second address means arranged to effect reading from the storage locations of the first memory in a sequence synchronized with the radar sweeps and, at substantially the same time, to effect the writing of the quantities P and W read from the first memory into the second memory at locations depending on the range values R associated with said quantities;

(iii) third address means arranged to effect at each radar sweep the reading of the storage locations of the second memory as a function of range;

register means is provided for receiving the P-values from the second memory during a number of sweeps determined by the associated W values; and

video signal generator means is provided for converting the P-values from the register means to video signals for application to the display system.

4,710,774

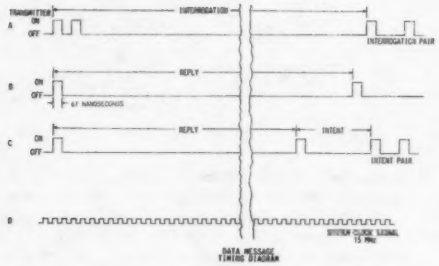
AIRCRAFT COLLISION AVOIDANCE SYSTEM

Edmond R. Gunny, 7612 Alverstone Ave., Los Angeles, Calif. 90045

Filed Feb. 18, 1986, Ser. No. 830,629

Int. Cl.[4] G01S *3/02*

U.S. Cl. 342—455 **39 Claims**



1. An aircraft collision avoidance system in which a plurality of aircraft are equipped with radio communication systems, each such communication system comprising:

message receiving and transmitting means;

data processing means coupled to the transmitting means for generating plural-data-content interrogation messages in accordance with a first selected format and for generating reply messages in accordance with a second selected format;

said data processing means further including means for decoding a received interrogation message according to said first format and means for initiating generation of a reply message thereto in said second format if and only if the data decoded from said received interrogation message indicates proximity of the interrogating aircraft to the receiving aircraft within preselected limits;

wherein said first and second formats comprise brief initiation and termination pulses spaced apart by a time duration of silence corresponding to the data content of the message.

4,710,775

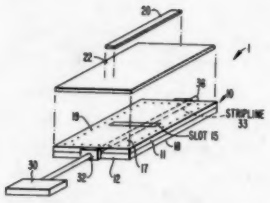
PARASITICALLY COUPLED, COMPLEMENTARY SLOT-DIPOLE ANTENNA ELEMENT

Richard J. Coe, Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 30, 1985, Ser. No. 781,650

Int. Cl.[4] H01Q *21/00*

U.S. Cl. 343—727 **32 Claims**



1. A parasitically coupled, complementary slot-dipole antenna element adapted to be coupled to a source of excitation signals having a center frequency, said antenna element comprising:

a driven, cavity-backed slot antenna element adapted to be coupled to said source of excitation signals, said cavity-based slot antenna element having a first axis and a slot with a longitudinal axis transverse to said first axis of said cavity-backed antenna element; and

a parasitic dipole element displaced a selected distance from said cavity-backed slot antenna element and having a longitudinal axis which is parallel with said first axis of said cavity-backed slot antenna element for producing a relatively symmetrical electromagnetic signature of increased bandwidth, said parasitic dipole element and said cavity-backed slot antenna element resonating approximately at said center frequency.

4,710,776

POWER DIVIDER FOR MULTIBEAM ANTENNAS WITH SHARED FEED ELEMENTS

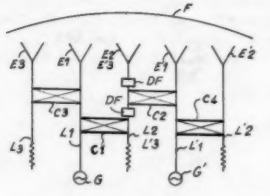
Antoine G. Roederer, Noordwijk, Netherlands; Guilio Doro, and Marco Lisi, both of Rome, Italy, assignors to Agence Spatiale Europeenne, Paris, France

Filed Dec. 13, 1984, Ser. No. 680,800

Claims priority, application France, Jan. 5, 1984, 84 00103

Int. Cl.[4] H01Q *13/00*

U.S. Cl. 343—778 **8 Claims**



1. An antenna for transmitting or receiving closely spaced multiple beams, with very low level sidelobes, of the type comprising, for each beam, a beam feed consisting of a primary source (G; G'1) feeding several radiating elements (E1, E2, E3; E'1, E'2, E'3), through a feed line (L1; L'1), the primary source (G; G') having at least one main element (E1; E'1) surrounded by a plurality of secondary radiating elements (E2, E3; E'2, E'3) some of which (E2; E'3) are shared between several adja-

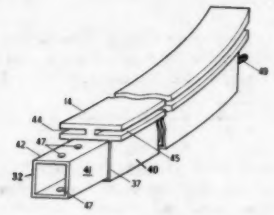
cent beam feeds, the power supplied by the primary source (G; G') being distributed to the different elements by means of couplers, characterized in that each secondary radiating element (E2; E'3) shared between at least two adjacent beams feeds is fed from each of the power transmission lines (L1; L'1) feeding the main element (E1; E'1) of said adjacent beams through a respective coupler (C1, C2), each coupler (C1, C2) being mounted is series on the transmission line (L2, L'3) of the secondary radiating element (E2, E'3) shared.

4,710,777

DISH ANTENNA STRUCTURE

Ross Halverson, Lone Rock, Wis., assignor to Kaultronics, Inc., Richland Center, Wis.

Filed Jan. 24, 1985, Ser. No. 694,435
Int. Cl.[4] H01Q *15/16*
U.S. Cl. 343—840 **21 Claims**



11. A support rib adapted for use in a dish antenna structure comprising:

(a) an outer sheath of flexible, resilient plastic material transparent to microwaves, having grooves along the side edges thereof defined by top and bottom walls, and an inner hollow channel in the sheath extending along its length beneath the grooves therein; and

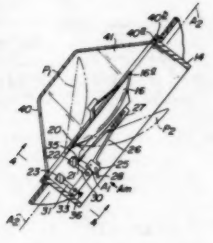
(b) a rigid inner support member fitted within the inner channel in the sheath to strengthen the rib and limit the longitudinal flexibility of the rib.

4,710,778

SATELLITE EARTH STATION

Mitchell C. Radov, 631 Montroyale Dr. East, Erie, Pa. 16504

Filed Aug. 7, 1985, Ser. No. 763,195
Int. Cl.[4] H01Q *3/02, 1/42*
U.S. Cl. 343—882 **15 Claims**



1. A satellite earth station, comprising:

frame means adapted to be fixedly mounted in a building roof for defining an opening therein;

concave dish antenna means having as peripheral rim received within said frame means opening and movable therein;

means carried by said frame means mounting said antenna for adjustable motion in said opening relative to said frame means, said mounting means cooperating with said frame means to dispose said antenna rim substantially coplanar with the roof when the antenna is in a home position; and

canopy means overlying said frame means opening and cooperating therewith to define a space above the opening for receiving at least a displaced portion of the antenna means;

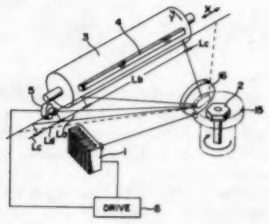
whereby the position of the antenna means can be adjusted relative to the roof.

4,710,779

OPTICAL RECORDING APPARATUS

Shirsuke Funaki, Hachioji; Yuichi Akanabe, Kunitachi, and Hiroaki Ikeda, Tachikawa, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

PCT No. PCT/JP81/00333, § 371 Date Jul. 1, 1982, § 102(e) Date Jul. 1, 1982, PCT Pub. No. WO82/01797, PCT Pub. Date May 27, 1982
Continuation of Ser. No. 395,007, Jul. 1, 1982, abandoned. This PCT application Nov. 13, 1981, Ser. No. 769,763
Claims priority, application Japan, Nov. 14, 1980, 55-160573
Int. Cl.[4] G01D *18/00*; G11B *7/00*; H04N *1/23*; H01S *3/13*
U.S. Cl. 346—1.1 **4 Claims**



1. In a recording method wherein a scanning operation is conducted with a light beam which is modulated on the basis of image information, the improvement which comprises driving a laser beam before scanning a leading edge of a page, generating a photoconverted signal of an optical output of said laser beam, repeatedly controlling said optical output based on a difference signal corresponding to a difference between said photoconverted signal and a reference signal so as to reduce said difference and maintaining a power supply to a controlled value during a period of recording said page.

4,710,780

RECORDER WITH SIMULTANEOUS APPLICATION OF THERMAL AND ELECTRIC ENERGIES

Koichi Saito; Yoshihiko Fujimura, and Nanao Inoue, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Mar. 26, 1987, Ser. No. 30,437
Claims priority, application Japan, Mar. 27, 1986, 61-67308
Int. Cl.[4] G01D *9/00, 15/18*
U.S. Cl. 346—1.1 **7 Claims**

1. An image recording head for jetting a liquid coloring agent at a recording member to form images of corresponding picture elements comprising:

a pair of wall members arranged a fixed space apart to contain the liquid coloring agent between the inner faces thereof, the edges of said wall members forming a discharge portion on one side thereof, the inner face of at least one of said wall members having a methodically uneven pattern in said discharge portion composed of a plurality of portions with similar cross-sections;

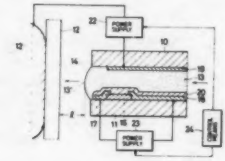
thermal energy applying means for heating the liquid coloring agent between said wall members; and

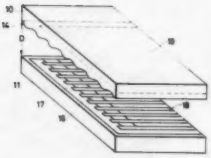
electric energy applying means for applying an electric field to the liquid coloring agent between said wall members; said thermal energy applying means comprising at least

one heating element on the inner face of one of said wall members, for selectively heating an area thereof corresponding to a location for jetting a portion of the liquid coloring agent through said discharge portion.

6. A method of recording images at high speed comprising the steps of:

providing a recording head including a pair of spaced apart wall members with a liquid coloring agent therebetween;





applying a uniform electric field to the liquid coloring agent arranged between the pair of wall members;

heating said agent in a selected local area thereof to cause said agent to be jetted from the selected area at a recording medium; and

providing on one of said wall members a periodic pattern of modulation to restrain said agent in unheated areas thereof from being jetted.

4,710,781

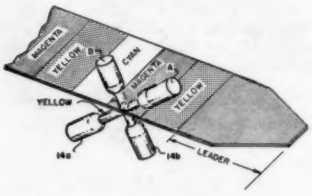
THERMAL PRINTER COLOR DYE FRAME IDENTIFICATION USING RED AND YELLOW LIGHT SOURCES

Stanley W. Stephenson, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 4, 1986, Ser. No. 892,620

Int. Cl.[4] G01D *15/10*; B41J *3/20*

U.S. Cl. 346—76 PH **3 Claims**



1. In a thermal printer system including a printer which uses a carrier with a repeating series of spaced yellow, magenta and cyan dye frames, and a receiver which receives dye from the yellow, magenta and cyan dye frames of a series to form a colored image, such printer including a print head having a plurality of selectively energizable heating elements, means for moving the carrier and the receiver along respective paths so as to sequentially move each dye frame of a series and the receiver relative to the print head such that as the heating elements are selectively energized, dye from each dye frame of a series is transferred to the receiver and forms a colored image in the receiver, means for identifying dye frames of such series comprising:

(a) a red LED disposed adjacent to the carrier path for illuminating the carrier with red light;

(b) a yellow LED disposed adjacent to the carrier path for illuminating the same dye frame of the carrier illuminated by red light with yellow light;

(c) first and second spaced photodetectors disposed adjacent to the carrier path and respectively responsive to the intensity of yellow and red light which passes through the dye frames for respectively providing electrical signals, the levels of such signals being a function of the intensity of source light which passes through a dye frame;

(d) said first photodetector producing a signal level above a threshold level when illuminated by yellow light passing through a yellow dye frame and below such threshold level when illuminated by yellow light passing through a cyan or magenta dye frame, said second photodetector producing a signal level above the threshold level when illuminated by red light passing through a yellow or a magenta dye frame and below such threshold level when illuminated by red light passing through cyan dye frames; and

(e) means responsive to the threshold levels such first and second photodetector for identifying the particular dye frame being illuminated by the red and yellow light sources.

4,710,782

CURRENT-APPLYING THERMAL TRANSFER FILM

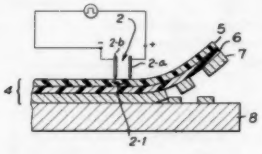
Seiichi Hayashi; Takashi Nakamura, both of Nagano, and Hisayuki Tanabe, Osaka, all of Japan, assignors to Seiko Epson Corporation, Tokyo and Nippon Kores Kabushiki Kaisha, Osaka, both of, Japan

Filed Aug. 28, 1986, Ser. No. 901,332

Claims priority, application Japan, Aug. 29, 1985, 60-190763

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 R **15 Claims**



1. A current-applying thermal transfer film, comprising:

a support layer;

a current-applying exothermic resistance layer disposed on one surface of the support layer, the resistance layer including about 10 to 40 wt % conductive dispersion particles (Ck), about 45 to 75 wt % thermoplastic polyester copolymer (Cs), and about 2 to 15 wt % cellulose nitrate; and

an ink layer disposed on the opposed surface of the support layer.

4,710,783

TEMPERATURE COMPENSATED CONTINUOUS TONE THERMAL PRINTER

Holden Caine, and Scott A. Brownstein, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 24, 1986, Ser. No. 889,140

Int. Cl.[4] G01D *15/10*; H04N *1/23*; B41J *3/20*

U.S. Cl. 346—76 PH **4 Claims**

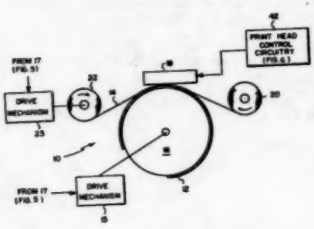
1. In a continuous tone thermal printing apparatus including a print head having a plurality of heating elements, one for each image pixel formed into a plurality of groups of heating elements, the heating elements of each group being simultaneously addressable in parallel N different times and selec-

tively energizable when addressed with constant current pulses to provide N different possible temperature levels, the improvement comprising:

(a) a shift register having one operative stage for each heating element;

(b) a digital memory for holding a selectable number of dye density words, each such word being representative of the dye density level of a particular image pixel;

(c) logic means responsive to the dye density words for sequentially storing N image data digital signals in the stages of the storage device in which the state of each



stage corresponds to whether or not a corresponding heating element is to be selectively energized;

(d) means for sequentially addressing the groups of heating elements each time one of the N image data digital signal is stored in the storage device with each group of heating elements being addressed N separate times;

(e) means for producing a signal representative of the average temperature of the print head; and

(f) means responsive to such average temperature signal for selectively energizing each heating element each time it is addressed and for adjusting the pulse width of the constant current pulse applied to the heating elements.

4,710,784

INK JET PRINTING DEVICE

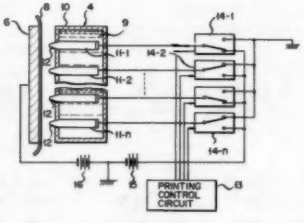
Tetsuroh Nakayama, Mishima, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Jul. 2, 1986, Ser. No. 881,140

Claims priority, application Japan, Jul. 11, 1985, 60-153301; Jul. 12, 1985, 60-153490

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **11 Claims**



1. An ink jet printing device, comprising:

a first electrode;

a printing head of an ink jet type having at least one second electrode, and means for supporting said printing head so that said at least one second electrode faces said first electrode for discharging ink from said second electrode toward said first electrode in response to a voltage applied between said first and said second electrodes during a printing cycle;

power supply means connected to said first and said second electrodes for applying said voltage from at least one voltage source;

means for supporting a recording medium between said printing head and said first electrode;

printing control means coupled to said power supply means for selectively applying a voltage between said first and said second electrodes according to predetermined dot data representing a character to be printed, and for controlling the amount of ink discharged from said second electrode of said printing head by varying electric energy applied between said first and said second electrodes according to a preset concentration code, and the size of ink markings to be printed on the recording medium is correspondingly varied to obtain a desired grade of printed tone.

4,710,785

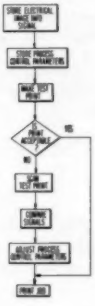
PROCESS CONTROL FOR ELECTROSTATOGRAPHIC MACHINE

Borden H. Mills, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 12, 1986, Ser. No. 940,832

Int. Cl.[4] G01D *15/06*

U.S. Cl. 346—153.1 **5 Claims**



1. In an electrostatographic machine having at least one adjustable process control parameter and means for receiving electrical image information signals of an original; the improvement comprising:

means for electronically storing the received electrical image information signal of an original;

means for creating a reproduction of the original using the received electrical image information signal;

means for creating a second electrical image information signal from said reproduction;

means for comparing said second electrical image information signal with the first electrical image information signal to produce an error signal representative of differences therebetween; and

means, responsive to said error signal, for adjusting the process control parameter to minimize said differences.

4,710,786
WIDE BAND GAP SEMICONDUCTOR ALLOY MATERIAL

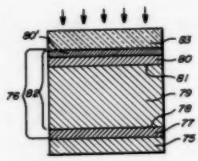
Stanford R. Ovshinsky, 2700 Squirrel Rd., Bloomfield Hills, Mich. 48013, and Arun Madan, 31520 Evergreen, Birmingham, Mich. 48000

Continuation of Ser. No. 710,359, Apr. 18, 1985, which is a continuation of Ser. No. 540,153, Oct. 7, 1983, which is a continuation of Ser. No. 427,688, Sep. 29, 1982, Pat. No. 4,409,605, which is a continuation of Ser. No. 222,489, Jan. 5, 1981, abandoned, which is a continuation-in-part of Ser. No. 104,284, Dec. 17, 1979, abandoned, which is a division of Ser. No. 887,353, Mar. 16, 1978, Pat. No. 4,226,898. This application Jun. 9, 1986, Ser. No. 872,075

The portion of the term of this patent subsequent to Oct. 11, 2000, has been disclaimed.

Int. Cl.[4] H01L *45/00*

U.S. Cl. 357—2 6 Claims



1. An improved amorphous semiconductor alloy, said alloy including a host matrix of silicon and incorporating therein carbon or nitrogen and further incorporating therein a plurality of different and complimentary density of states reducing elements for forming a wide band gap silicon alloy having altered electronic configurations and without substantially increasing the states in the gap.

4,710,787
SEMICONDUCTOR DEVICE

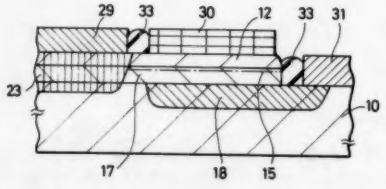
Toshiyuki Usagawa, Kokubunji; Yuichi Ono, and Susumu Takahashi, both of Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 27, 1984, Ser. No. 686,691

Claims priority, application Japan, Dec. 28, 1983, 58-246279

Int. Cl.[4] H01L *29/161, 29/74, 29/12, 29/06*

U.S. Cl. 357—16 9 Claims



1. A semiconductor device comprising, at least, a three-layer structure in which a first semiconductor layer and a second semiconductor layer are arranged so as to define a heterojunction and in which the second semiconductor layer and a third semiconductor layer were arranged so as to define a junction, a source electrode which is connected with two-dimensional carriers which accumulate in the vicinity of the heterojunction interface, a drain electrode which is electrically connected to said two-dimensional carriers at the heterojunction only through a series connection path formed of said third semiconductor layer and the junction of the third semiconductor layer with the second semiconductor layer, and a gate electrode which is connected to said first semiconductor layer and which serves as control means for the two-dimensional carriers, wherein said third semiconductor layer is selectively formed in a semi-insulating substrate, wherein said semi-insulating substrate has an upper and lower surface, with the third semiconductor layer being formed in the upper surface, and wherein said source, drain and gate electrodes are all formed over the upper surface of said semi-insulating substrate.

4,710,788
MODULATION DOPED FIELD EFFECT TRANSISTOR WITH DOPED SI_xGE_{1-x}-INTRINSIC SI LAYERING

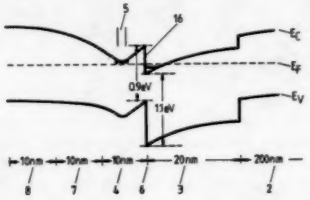
Heinrich Dämbkes, Ulm; Hans-J. Herzog, Neu-Ulm, and Helmut Jorke, Gerstetten, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

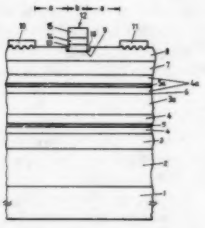
Filed Dec. 1, 1986, Ser. No. 936,257

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1985, 3542482

Int. Cl.[4] H01L *29/80*

U.S. Cl. 357—22 14 Claims





1. In a modulation doped field effect transistor including a silicon substrate on which a modulation doped silicon-germanium alloy/silicon layer sequence has been applied, and at least one control electrode, a source electrode and a drain electrode disposed on the outermost silicon layer, the improvement wherein said layer sequence includes at least one n-conductive channel which is formed by a heterostructure produced by at least one combination of an undoped silicon layer and at least one n-doped silicon-germanium alloy layer.

4,710,789
SEMICONDUCTOR MEMORY DEVICE

Kiyohiro Furutani; Koichiro Mashiko, and Kazutami Arimoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1986, Ser. No. 937,206

Claims priority, application Japan, Jan. 30, 1986, 61-20614

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.6 5 Claims

1. A semiconductor memory device comprising

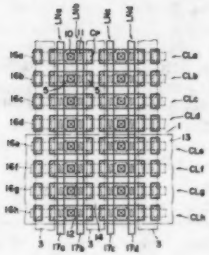
a plurality of memory cells arranged in rows and columns to form a matrix,

a first bit line to which memory cells of a first column are connected, each of the memory cells of the first column comprising an N-channel FET and capacitance means,

a second bit line to which memory cells of a second column are connected, each of the memory cells of the second column comprising a P-channel FET and capacitance means,

the first bit line and the second bit line being connected to complementary terminals of a sense amplifier to form a folded-bit line pair,

a word line connected to the gate of the N-channel FET of one of the memory cells of the first column and to the gate



of the P-channel FET of one of the memory cells of the second column, and

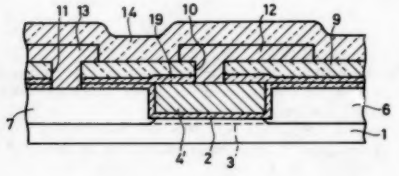
means selectively providing the word line with a first voltage to make conductive the N-channel FET connected thereto and to make nonconductive the P-channel FET connected thereto, or a second voltage to make conductive the P-channel FET connected thereto and make nonconductive the N-channel FET connected thereto, or a third voltage to make nonconductive both the N-channel FET and the P-channel FET connected thereto.

4,710,790

MOS TRANSISTOR

Tatsuo Okamoto; Kouji Eguchi, and Saburou Oosaki, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 3, 1984, Ser. No. 627,470
Claims priority, application Japan, Sep. 26, 1983, 58-179647
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.6 **5 Claims**



1. A MOS transistor comprising:

a semiconductor substrate having a depression formed on one major surface thereof;

an insulating film formed at least on an inner bottom surface and a side surface of said depression;

a gate electrode formed in said depression coated with said insulating film; and

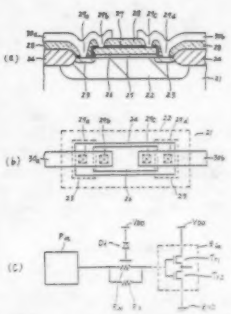
a source region and a drain region formed in said major surface of said semiconductor substrate so as to be opposed to each other with said depression being located therebetween, wherein substantially the entire upper surface of said gate electrode is generally flat and approximately even with said major surface of said semiconductor substrate and contained substantially entirely within said depression.

4,710,791

PROTECTION DEVICE IN AN INTEGRATED CIRCUIT

Takehide Shirato, Hiratsuka, and Shinichi Sekine, Yokohama, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Jul. 30, 1985, Ser. No. 760,368
Claims priority, application Japan, Aug. 9, 1984, 59-166823
Int. Cl.[4] H01L *29/78*
U.S. Cl. 357—23.13 **7 Claims**



1. A protection device formed on a semiconductor substrate of an IC and connected in a circuit in series with at least one of an input to and output from a circuit formed on said IC, said protecion device comprising:

a diffusion region formed on said substrate and having a conductivity type opposite to that of the substrate;

an insulating layer covering said diffusion region;

a resistance body composed of polysilicon formed on said insulating layer over said diffusion region so as to be electrically isolated from said substrate by said diffusion region; and

at least one contact region formed entirely within said diffusion region comprising a layer doped at a higher rate with the same conductivity type of impurity as that of the diffusion region, said resistance body and said diffusion region being electrically connected in parallel through said contact region;

said parallel connected resistance body and diffusion region being connected in series between at least one of an input pad and output pad and said at least one of an input to and output from a circuit.

4,710,792

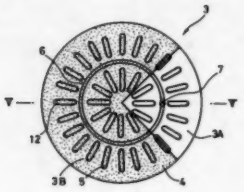
GATE TURN-OFF THYRISTOR

Masanori Suzuki, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1985, Ser. No. 705,118
Claims priority, application Japan, Apr. 17, 1984, 59-78924
Int. Cl.[4] H01L *29/74, 29/167*
U.S. Cl. 357—38 **4 Claims**

1. In a gate turn-off thyristor comprising a semiconductor wafer structured by a first base layer (8*c*) of a first conductivity type semiconductor, a second base layer (8*b*) of second conductivity type semiconductor adjacent to one side of said first base layer (8*c*), a first emitter layer (8*d*) of said second conductivity type semiconductor adjacent to the other side of said first base layer (8*c*), and a plurality of second emitter regions (8*a*) of said first conductivity type semiconductor formed on the outer surface of said second base layer (8*b*) excluding a region assigned for a gate region, further comprising a first electrode (9) on the outer surface of said first emitted layer (8*d*), second electrodes (5) on the outer surfaces of said second emitter regions (8*a*), a gate electrode (4) on the outer surface of said

gate region and a lead-out point (7) for said gate electrode (4), the improvement wherein said semiconductor wafer (8) includes a plurality of areas (3A and 3*b*) having different carrier lifetimes, said lifetime being the longest in a first area (3A) of said areas where said gate lead-out point (7) is positioned and said lifetime being shorter in a second area (3B) of said areas



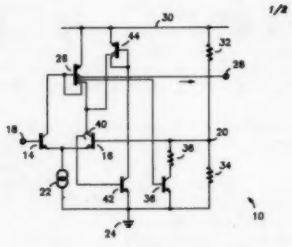
further from said gate led-out point (7) wherein said lifetime is controlled by carrier killer of Au or Pt diffused in said wafer and the concentration of said carrier killer is the lowest in said first area and becomes higher in the second area farther from said gate lead-out point (7) wherein said carrier lifetime in said second area is shortest in the second emitter region further from the first area.

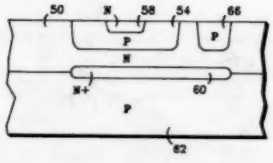
4,710,793

VOLTAGE COMPARATOR WITH HYSTERESIS

Randall C. Gray, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 4, 1985, Ser. No. 772,579
Int. Cl.[4] H01L *27/02;* **H03K** *3/33, 5/153, 19/20*
U.S. Cl. 357—44 **2 Claims**





1. An integrated circuit for producing output transitions in response to an input signal passing through and exceeding a first threshold voltage level then passing through and falling below a second threshold voltage level whereby hysteresis is established, comprising:

a differential amplifier including first and second transistors coupled respectively to first and second inputs of the differential amplifier, the input signal being applied to said first input, said differential amplifier having an output at which the transitions occur, said first and second transistors each having a collector region, a base region and an emitter region, said base regions being coupled respectively to said first and second inputs of said differential amplifier, said emitter regions being connected together, first current source means for providing currents to said collector regions of said first and second transistors, and second current source means coupled to said emitter regions of said first and second transistors, said first current source means including a transistor having multiple collector regions, the emitter region of which is coupled to a power supply, the base region being coupled to said collector region of said first transistor and to one of said multiple collector regions, a second one of said collector regions being coupled to said collector of said second transistor, and a third one of said collector regions being coupled to said output of said differential amplifier;

threshold level determining means for producing the first and second threshold voltage levels at an output which is coupled to said second input of said differential amplifier, said threshold level determining means including a plurality of resistors connected in series for establishing said first threshold voltage level corresponding to a first voltage level therebetween at said output of said threshold level determining means, and a third transistor the collector and emitter regions being coupled across one of said plurality of series connected resistors and having a base region coupled to a fourth one of said collector regions of said transistors of said first current source means, said third transistor being rendered conductive by the input signal exceeding said first threshold voltage level for causing said first threshold voltage level to be reduced to said second threshold voltage level; and

collector means responsive to said second transistor becoming saturated for inhibiting saturation current therefrom being sourced to the substrate of the integrated circuit, said collector means including a secondary region formed within the integrated circuit in spaced relationship about said collector region of said second transistor, said secondary region collecting said saturation current that otherwise would be injected into the substrate and a fourth transistor the base region of which is connected to said secondary region and having a collector region and an emitter region, said emitter region being connected to a source of ground reference potential; and

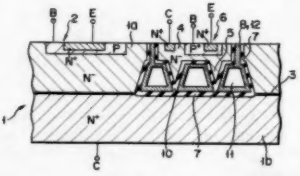
an additional multiple collector region transistor having an emitter region coupled to said power supply, a base region coupled with one of said multiple collector regions to said collector region of said fourth transistor, and a second one of said multiple collector regions being coupled to said collector region of said second transistor.

4,710,794

COMPOSITE SEMICONDUCTOR DEVICE

Yutaka Koshino, Yokosuka; Tatsuo Akiyama, Tokyo, and Yoshiro Baba, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 12, 1986, Ser. No. 828,536
Claims priority, application Japan, Feb. 13, 1985, 60-24389
Int. Cl.[4] H01L *27/12, 29/06, 25/04*
U.S. Cl. 357—49 **6 Claims**



1. A composite semiconductor device, comprising:

a composite substrate including first and second semiconductor substrates, one surface of each of said substrates being mirror-polished, with said mirror-polished surfaces being bonded together at a bonding interface, said first semiconductor substrate having a space adjacent to said bonding interface and an annular insulating layer embedded therein and extending from a surface of said first semiconductor substrate opposite the bonding interface to a peripheral edge portion of said space, said space and insulating layer defining a first portion of said first semiconductor substrate said first portion being electrically isolated from a second portion of said first semiconducotr substrate adjacent thereto and from said second semiconductor substrate;

at least one pillar extending from a bottom of said first portion to said interface, for supporting said first portion;

a first functional element formed in said first portion; and a second functional element formed in said second portion.

4,710,795

SEMICONDUCTOR POWER MODULE

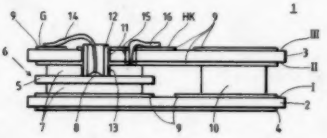
Georg Nippert, Worms; Berthold Hahn, Lampertheim, both of Fed. Rep. of Germany, and Jens Gobrecht, Gebenstorf, Switzerland, assignors to Brown, Boveri & CIE Aktiengesellschaft, Mannheim-Kaefertal, Fed. Rep. of Germany

Filed Feb. 25, 1985, Ser. No. 705,089

Claims priority, application Fed. Rep. of Germany, Feb. 23, 1984, 3406528

Int. Cl.[4] H01L *21/447, 23/10, 23/40, 23/14*

U.S. Cl. 357—65 **19 Claims**



1. Semiconductor power module, comprising at least one upper substrate and at least one lower substrate, said substrates being mutually parallel and formed of ceramic, each substrate having upper and lower sides, metallizations disposed on at least said upper and lower sides of said upper substrate and said upper side of said lower substrate, at least one controlled semiconductor power component disposed between each two respective substrates and electrically contacted by said metallizations disposed on said lower side of said upper substrate and on said upper side of said lower substrate, defining a substrate above said component and a substrate below said component, said substrate above said component having at least one hole formed therein above said component for accommodating control connections to said component, said metallization disposed on said upper side of said upper substrate being structured.

4,710,796

RESIN ENCAPSULATION TYPE SEMICONDUCTOR DEVICE BY USE OF EPOXY RESIN COMPOSITION

Hirotoshi Ikeya, Yokosuka, and Michiya Higashi, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed May 31, 1985, Ser. No. 739,920

Claims priority, application Japan, Aug. 23, 1984, 59-174148

Int. Cl.[4] H01L *23/28*

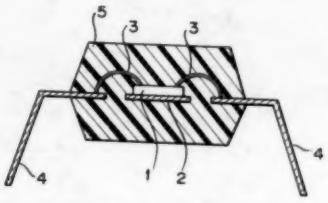
U.S. Cl. 357—72 **12 Claims**

1. A resin encapsulation type semiconductor device having a semiconductor element and a resinous encapsulating material for encapsulating said semiconductor element therein, said resinous encapsulating material comprising a cured product of an epoxy resin composition for encapsulation of semiconductor, comprising:

(a) 100 parts by weight of an epoxy resin;

(b) 5 to 500 parts by weight of a curing agent having at least two phenolic hydroxyl groups in one molecule;

(c) 0.01 to 20 parts by weight of an organic phosphine compound; and



(d) 0.1 to 100 parts by weight of at least one antimony oxide selected from the group consisting of diantimony tetroxide, hexaantimony tridecaoxide and diantimony pentoxide.

4,710,797

ERASABLE AND PROGRAMABLE READ ONLY MEMORY DEVICES

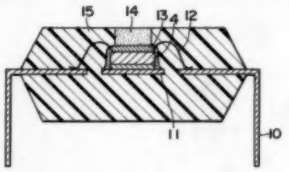
Seietsu Tanaka, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1984, Ser. No. 586,998

Claims priority, application Japan, Mar. 14, 1983, 58-40579

Int. Cl.[4] H01L *23/08, 23/18*

U.S. Cl. 357—74 **2 Claims**



1. An erasable and programable read only memory device of the plastic package type comprising:

an integrated circuit lead frame having an island area and a plurality of lead wires;

an erasable and programable read only memory integrated circuit chip having an upper surface and a bottom surface, the bottom surface thereof mounted on said island area;

a plurality of wires each adapted to connect a bonding pad of said erasable and programable read only memory integrated circuit chip to one of said lead wires of said integrated circuit lead frame;

a thin silicone resin layer formed on the upper surface of said erasable and programable read only memory integrated circuit chip for transmitting ultraviolet rays to the upper surface of said erasable and programable read only memory integrated circuit chip;

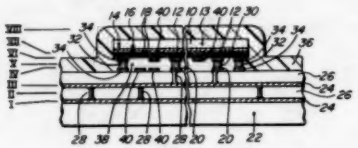
a window plate placed on the surface of said silicone resin layer to be bonded with said silicone resin layer, said window plate being of a high-purity alumina which can transmit ultraviolet rays; and

a molded package of epoxy resin which prevents transmission of ultraviolet rays encapsulating said island area of said integrated circuit lead frame, said erasable and programable read only memory integrated circuit chip and said silicone resin layer without covering a surface of said window plate through which ultraviolet rays are transmitted to said erasable and programable read only memory integrated circuit chip.

4,710,798
INTEGRATED CIRCUIT CHIP PACKAGE

Gabriel Marcantonio, Nepean, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Sep. 12, 1985, Ser. No. 775,277
Int. Cl.[4] H01L *23/02, 23/12, 23/48*
U.S. Cl. 357—80 12 Claims



1. An integrated circuit chip package comprising:

an integrated circuit chip having a plurality of circuit elements contained therein, said circuit elements being electrically extended to a plurality of bonding pads on a surface thereof,

a substrate having a plurality of bonding pads on a surface of the substrate, said surface of the substrate facing said surface of the chip,

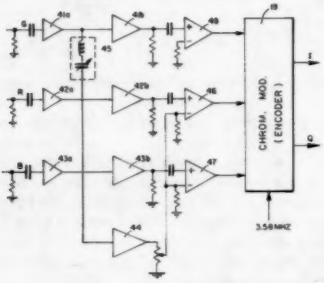
a connection extending from selected bonding pads on the chip to corresponding bonding pads on the substrate, and

material extending from said chip surface to said substrate surface for defining a perimeter of a sealed cavity formed between said chip surface and said substrate surface.

4,710,799
HIGH RESOLUTION COLOR TELEVISION

Jimmie D. Songer, Burleson, Tex., assignor to High Resolution Television, Inc., Los Angeles, Calif.

Filed Jun. 22, 1984, Ser. No. 623,421
Int. Cl.[4] H04N *11/06*
U.S. Cl. 358—12 5 Claims



1. An improved method for increasing the vertical resolution of color television display on a picture tube of a program from a color television camera, wherein the camera has three pick-up tubes which produce television camera signals, one tube with a green filter, one tube with a red filter and one tube with a blue filter, and all three pick-up tubes are driven to produce synchronous horizontal scans in interlaced fields of a frame with only the horizontal scan of the green pick-up tube further modulated vertically to scan each line along an undulating path at a predetermined frequency, and wherein all three electron beams for the green, red and blue display of said picture tube are synchronously modulated with the electron beam modulation of the camera pick-up tubes, comprising the steps of

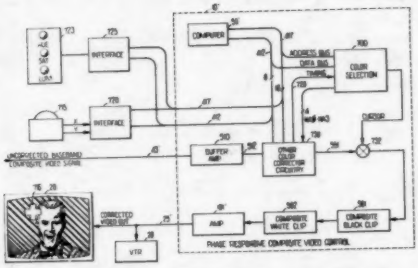
filter trapping the television camera signal from said green camera pick-up tube at said predetermined undulating modulation frequency in a narrow bandwidth of about $\pm\frac{1}{2}$ MHz, and

combining said filter trapped green television camera signal with television camera signals from said red and blue camera pick-up tubes in a differential amplifier such that said green television camera signal is added to the red and blue television camera signals, thereby pseudomodulating the red and blue television camera signals in synchronism with the green television camera signal as though the electron beam of the red and blue camera pick-up tubes were modulated to scan each line along an undulating path.

4,710,800
APPARATUS FOR ALLOWING OPERATOR SELECTION OF A COLOR REGION OF A VIDEO IMAGE FOR RECEIVING COLOR CORRECTIONS

Craig Fearing, Hollywood, and Michael L. Orsburn, Cooper City, both of Fla., assignors to Utah Scientific Advanced Development Center, Inc., Ft. Lauderdale, Fla.

Continuation-in-part of Ser. No. 760,339, Jul. 29, 1985, which is a continuation-in-part of Ser. No. 604,845, Apr. 27, 1984, Pat. No. 4,642,682. This application Sep. 16, 1985, Ser. No. 776,438
Int. Cl.[4] H04N *9/74, 9/68*
U.S. Cl. 358—22 32 Claims



1. In a video signal color correction system, an apparatus for selecting a region in a video image represented by an input video signal and for correcting a video parameter of said input video signal, comprising:

first operator control means for selecting a region on a video monitor displaying said image;

video signal correction means responsive to a video characteristic of said input video signal for selecting a particular one of a plurality of video signal correction signals for correcting a parameter of said input video signal to provide a corrected video output signal:

second operator control means for changing one of said plurality of video signal correction signals; and

means responsive to said video characteristic and said selected region for modifying said selected particular one of said video signal correction signals.

4,710,801
SYSTEM FOR DECOMPOSITION OF NTSC COLOR VIDEO SIGNALS USING TWO FRAME BUFFERS

Charles A. Kunzinger, Morrisville, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 29, 1985, Ser. No. 728,013
Int. Cl.[4] H04N *9/66*
U.S. Cl. 358—23 3 Claims

1. For use in a freeze frame video system having an analog input conforming to NTSC color signal standards, a method for decomposing composite NTSC signals into luminance (Y) and chrominance (C) components comprising the steps of:

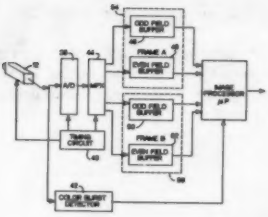
digitizing the analog input at predetermined sampling instants corresponding to recurring phase angle displace-

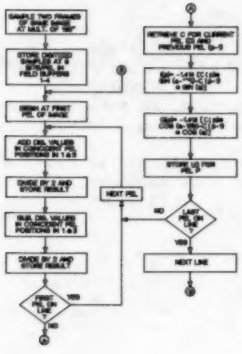
ments relative to the phase of the color burst component of the analog input, said displacements including those at ±90° and 180° relative to the color burst phase;

storing the digitized pel values in memory locations corresponding to pel positions in four successive image fields;

establishing Y values for selected pels as a function of the sum of stored digitized pel values occupying corresponding coincident pel positions in non-successive fields;

establishing C values for selected pels as a function of the difference between stored digitized pel values occupying corresponding coincident pel positions in non-successive fields; and





deriving I and Q values based on the established C value for each selected pel, said deriving step comprising the further steps of

retrieving the established C values for two successive pels p and p-1 on a given line,

solving the below stated equations for I and Q

$$I = -1.414[C(p)*\sin(a-135) - C(p-I)*\sin(a)]$$

$$Q = +1.414[C(p)*\cos(a-135) - C(p-1*\cos(a)]$$

where a is the sampling angle phase for pel position p, nd assigning the calculated I and Q values of both of the pels p and p−1.

4,710,802

TELEVISION RECEIVER INCLUDING A CIRCUIT ARRANGEMENT FOR DEMODULATING AN NTSC-CODED COLOR SIGNAL

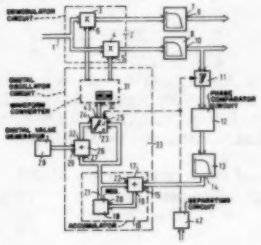
Otto L. Warmuth; Martin H. Johanndeiter, both of Hamburg, Fed. Rep. of Germany, and Johannes G. Raven, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 4, 1986, Ser. No. 836,034

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511440

Int. Cl.⁴ H04N 9/66

U.S. Cl. 358—25 **8 Claims**



1. A color television signal receiver including a circuit arrangement for demodulating an NTSC-encoded chrominance signal available as a sequence of digital values, including an oscillator circuit (**33**) producing two reference signals of a chrominance subcarrier frequency and said reference signals being different in phase relative to each other, the oscillator circuit comprising an accumulator (**16**) which produces an output signal, said accumulator incorporating a register (**18**) coupled at its output to an output (**21**) of said accumulator and a first modulo-adder (**17**) coupled at its input to an input of said accumulator and coupled at its output to an input of said register and a waveform converter (**31**) which forms the reference signals from the accumulator output signal, and a phase comparator circuit (**12**) determining the phase of the reference signals and receiving during the occurrence of a color synchronizing signal in said NTSC-encoded chrominance signal, a signal produced in at least one demodulator (**2**) multiplying the chrominance signal by at least one of said reference signals, characterized in that in a first switching position of a change-over switch (**23**) an adjustable value is added in a second adder (**26, 38**) to the accumulator output signal and an output signal of the adder is applied to the waveform converter (**31**) and that the change-over switch (**23**) is in a second switching position during the occurrence of the color synchronizing signal, in said second position the accumulator output signal is applied to the waveform converter.

4,710,803

COLOR FILTER AND COLOR IMAGE SENSOR USING THE SAME

Kenji Suzuki; Takaaki Terashita, and Jin Murayama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 3, 1987, Ser. No. 11,421

Claims priority, application Japan, Feb. 5, 1986, 61-22155

Int. Cl.⁴ H04N 9/04, 9/07

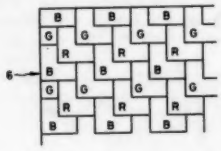
U.S. Cl. 358—41 **7 Claims**

1. A color filter having color areas of N colors, N being an integer at least equal to 3,

each of said color areas being L-shaped and having a first leg and a second leg,

said first legs being arranged in columns with portions of said second legs.

said second legs being arranged in rows with portions of said first legs, and



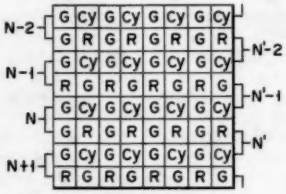
the number of different colors in each column and in each row being N−1.

4,710,804

COLOR FILTER ARRAYS FOR USE IN A SINGLE CHIP COLOR TELEVISION PICKUP SYSTEM USING THE FIELD INTEGRATION MODE

Yuji Ide, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 9, 1987, Ser. No. 12,490
Claims priority, application Japan, Feb. 18, 1986, 61-33353
Int. Cl.[4] H04N *9/07, 9/077*
U.S. Cl. 358—48 **8 Claims**



1. A color television pickup system comprising:

a solid state imaging device adapted for operation in a field integration mode; and

a mosaic color filter array disposed on said solid state imaging device, and having unit filter arrays arranged in columns and rows, each of said unit filter arrays having eight color filter elements arranged in two columns and four rows, an upper filter array of four filter elements and a lower filter array of four filter elements in each of said unit filter arrays each consisting of color filter elements of green (G), green (G), red (R) and cyan (Cy), four pairs of two adjacent color filter elements, in each of unit filter arrays, arranged in columns being different from each other in combination of colors, and each pair of two adjacent color filter elements arranged in a row having different colors.

4,710,805

METHOD OF, AND APPARATUS FOR, MODIFYING LUMINANCE LEVELS OF A BLACK AND WHITE VIDEO SIGNAL

Wilson Markle, Toronto, Canada, and Christopher Mitchell, Anaheim, Calif., assignors to Colorization Inc., Toronto, Canada

Filed Jul. 11, 1983, Ser. No. 512,844
Claims priority, application Canada, May 5, 1983, 427543
Int. Cl.[4] H04N *9/43*
U.S. Cl. 358—81 **2 Claims**

1. A circuit for receiving an input of a black and white video signal and for expanding and compressing bands of luminance levels to produce a modified signal at a output, the circuit comprising:

a voltage controlled amplifier connected between the input and the output, and adapted to receive the input video signal and a control signal;

first and second clipper amplifiers, each of which is adapted to receive the input video signal, and has means for adjusting the gain and means for adjusting the clip level of the

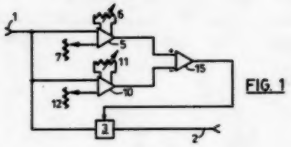


FIG. 1

respcective clipper amplifier to affect their respective outputs;

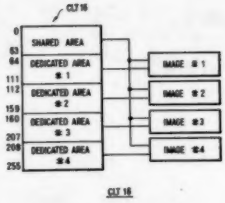
a summation device connected to the outputs of the first and second clipper amplifiers, for producing said control signal and connected to the voltage controlled amplifier to input said control signal thereto.

4,710,806

DIGITAL DISPLAY SYSTEM WITH COLOR LOOKUP TABLE

Shinichi Iwai, Kawasaki, and Sakae Uno, Hachiohji, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 24, 1986, Ser. No. 877,910
Claims priority, application Japan, Jul. 4, 1985, 60-145879
Int. Cl.[4] H04N *1/46*
U.S. Cl. 358—81 **4 Claims**



1. A digital display system comprising a frame buffer store, a color lookup table, means for accessing the color lookup table by data read from the frame buffer store to generate color data sequences for display on a display device, said table comprising a first area for storing color data common to a plurality of images and further areas each for storing color data different from the color data in said first area and relating to a corresponding one of said images, means for uniformly sampling a color space to generate the color data for said first area of said table, and quantizer means for adaptively sampling an input data image to generate the color data for the color lookup table area corresponding to that data image.

4,710,807
ILLUMINATING LIGHT SUPPLY SYSTEM IN ELECTRONIC ENDOSCOPE APPARATUS

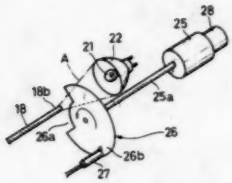
Toshio Chikama, Tokyo, Japan, assignor to Kabushiki Kaisha Machida Seisakusho, Tokyo, Japan

Filed Nov. 4, 1986, Ser. No. 927,267

Claims priority, application Japan, Nov. 11, 1985, 60-250847; Nov. 11, 1985, 60-250848; Dec. 28, 1985, 60-293566; Jan. 9, 1986, 61-1444

Int. Cl.⁴ H04N 7/18

U.S. Cl. 358—98 **23 Claims**



1. An electronic endoscope apparatus comprising:

(a) an endoscope including an operating body, an inserting body extending from said operating body, and a viewing window and an illuminating window provided at respective appropriate locations of said inserting portion;

(b) a solid state image pickup device including a light receiving portion for receiving images entering through said viewing window of said endoscope, and a memory portion for storing image signals from said light receiving portion;

(c) circuit means for converting the image signals from said image pickup device into television picture signals of an interlaced scanning system;

(d) a monitor television for displaying pictures on the basis of said television picture signals;

(e) light source means:

(f) an illuminating light transmitting optical system arranged within said endoscope, for transmitting an illuminating light from said light source means to said illuminating window;

(g) chopper means disposed between an end of said illuminating light transmitting optical system and said light source means and including at least one light shielding section and at least one light transmitting section;

(h) motor means for rotating said chopper means to cause said light shielding section and said light transmitting section of said chopper means to successively cross a luminous flux of the illuminating light, to thereby bring the illuminating light into the form of pulses; and

(i) synchronizing circuit means for controlling the rotation of said motor means in such a manner that a center of supply time duration of each of the illuminating light pulses is brought into coincidence with a point of time at which the image signals to be offered to either one of odd and even field scannings are transferred from said light receiving portion to said memory portion of said image pickup device.

4,710,808
MACHINE VISION DIFFERENTIAL MEASUREMENT SYSTEM

Leo Hoogenboom, Ballston Spa; Robert L. Jackson, Jr., Schenectady; Russell P. Kraft, Averill Park, and Alan M. Offt, Clifton Park, all of N.Y., assignors to Mechanical Technology Incorporated, Latham, N.Y.

Filed Aug. 5, 1986, Ser. No. 893,220

Int. Cl.⁴ H04N 7/18

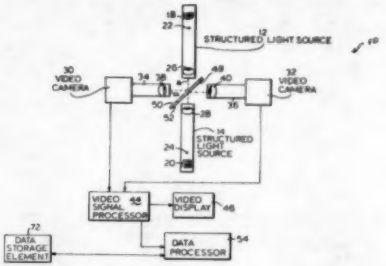
U.S. Cl. 358—107 **4 Claims**

1. A system for measuring a dimension of an object along a predetermined axis said object having a first and a second surface defining said dimensions, comprising:

projecting means for projecting first and second features on said first and second surfaces respectively along a first axis;

imaging means for projecting first and second features on first and second planes respectively along a second axis;

said first and secnd axis being perpendicular and said object being placed at an intersection between said first and second axis, with said predetermined axis forming an acute angle with said second axis; and



processing means for determining the distances between said features and corresponding reference points on said planes, and for determining said dimensions in accordance with said distances;

said projecting means including a first and a second structured light source, each said sources having a light generating element, an imaging element and a projection lens for projecting a reference image from said element along said first axis and

wherein the imaging element comprises a wire disposed perpendicularly with respect to said first axis wherein said first and second features are elongated dark features.

4,710,809
METHOD FOR THE REPRESENTATION OF VIDEO IMAGES OR SCENES, IN PARTICULAR AERIAL IMAGES TRANSMITTED AT REDUCED FRAME RATE

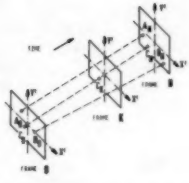
Joachim Ries, and K. Heinrich W. Dörgeloh, both of Braunschweig, Fed. Rep. of Germany, assignors to Deutsche Forschungs-und Versuchsanstalt fur Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany

Filed Jun. 25, 1986, Ser. No. 878,318

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1985, 3523424

Int. Cl.⁴ H04N 7/18, 7/12

U.S. Cl. 358—109 **6 Claims**



1. A method for the representation of video images, pictures or scenes, in particular aerial pictures with a relative movement between a pick-up sensor and the scene transmitted at reduced frame rate, said method comprising the steps of: generating, by interpolation or by extrapolation or by both interpolation and extrapolation on the basis of two transmitted frames, at least one intermediate frame; inserting said at least

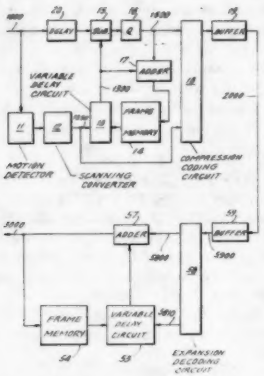
one intermediate frame into a transmitted frame sequence; determining the positions of picture elements (pels) identical in the two transmitted frames from the relationship of the positions of at least two pels on different vertical and horizontal coordinates in each of the two transmitted frames; determining, before reconstruction of said at least one intermediate frame for limited picture areas which represent the environment of the position of at least one of the corresponding pels in said two transmitted frames, the mean brightness values of these picture areas; subtracting or dividing these mean brightness values; and correcting the brightness value in the extrapolation zone of said at least one intermediate frame for which brightness values from only one of the transmitted frames of a frame sequence are available according to the resulting differences or quotients.

4,710,810

PREDICTIVE CODING/DECODING APPARATUS FOR VIDEO SIGNAL

Toshio Koga, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Mar. 5, 1985, Ser. No. 708,272
Claims priority, application Japan, Mar. 6, 1984, 59-42306
Int. Cl.[4] H04N *7/12*; H04B *1/66*
U.S. Cl. 358—133 **14 Claims**



1. A coding apparatus for encoding an input video signal, said apparatus comprising:

means for detecting motion contained in said input video signal and for generating motion vectors representative thereof, said motion being detected for each of several blocks into which a video picture frame associated with said input video signal is divided, said motion vectors being delivered in accordance with a time sequence associated with said blocks;

means for converting the time sequence of said motion vectors into converted motion vectors having a time sequence associated with said input video signal;

means for generating a prediction error signal in response to said input video signal and said converted motion vectors;

means for converting the time sequence of said prediction error signal into another time sequence to produce a converted prediction error signal; and

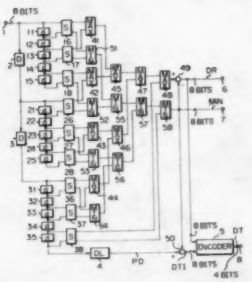
means for coding said converted prediction error signal by a variable length coding scheme.

4,710,811

HIGHLY EFFICIENT CODING APPARATUS FOR A DIGITAL VIDEO SIGNAL

Tetsujiro Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,742
Claims priority, application Japan, Dec. 21, 1984, 59-269866
Int. Cl.[4] H04N *7/12, 1/40*
U.S. Cl. 358—135 **7 Claims**



1. A highly efficient coding apparatus for coding digital video data in a format composed of blocks of digital video data representing plural picture elements and allowing compression of the video data, comprising:

first and second detecting means for detecting maximum and minimum values, respectively, of the digital video data representing the plural picture elements in each of said blocks;

means for generating dynamic range information for each said block from said maximum and minimum values for the respective block;

means for generating modified digital video data for each said block as the difference between each of the digital video data and one of said maximum and minimum values for said respective block;

means for encoding said modified digital video data with a variable digitized bit number determined by said dynamic range information for said respective block so as to provide coded data of variable bit length; and

transmitting means for transmitting the coded data of variable bit length and an additional code for each said respective block formed of at least two of said maximum and minimum values and a signal corresponding to said dynamic range information.

4,710,812

INTERFRAME ADAPTIVE VECTOR QUANTIZATION ENCODING APPARATUS AND VIDEO ENCODING TRANSMISSION APPARATUS

Tokumichi Murakami; Atsushi Itoh; Kohtaro Asai; Koh Kamizawa, and Masami Nishida, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 28, 1986, Ser. No. 833,269
Claims priority, application Japan, Feb. 28, 1985, 60-39351; Mar. 8, 1985, 60-46120; Apr. 5, 1985, 60-72094; Apr. 12, 1985, 60-77741; Sep. 30, 1985, 60-217320
Int. Cl.[4] H04N *7/12*
U.S. Cl. 358—136 **9 Claims**

1. An interframe adaptive vector quantization apparatus comprising:

a frame memory for storing at least one frame of video signals normally;

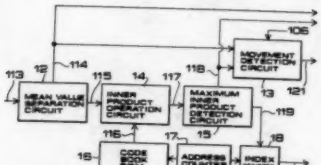
a subtractor where, when input signal series of K in number (K: integer) are brought together into a block and the last video signal series is inputted, prediction signal series in a

block at position corresponding to the same position as the previous block at least one frame before the previous signal series on the screen is read from the frame memory and the interframe difference signal series is calculated;

a mean value separation circuit for estimating intrablock mean value of the interframe difference signal series and converting it into input vector by the mean value separation;

a vector quantization encoding member for encoding the input vector into discrimination code of the output vector to maximize total sum of products of elements of the input and output vectors, i.e., the inner product, among a plurality of sets of the output vectors optimized by clustering method in the poly-dimensional space based on statistical properties of normalization vectors by the normalization of the input vectors by the intrablock standard deviation;

a movement detection circuit for executing processing that a block having amplitude coefficient as the total sum of products and the intrablock mean value both being less than prescribed threshold value is made insignificant



block and the intrablock picture element values of the interframe difference signal series are made all zero;

a vector quantization decoding member for selecting output vector among the output vector discrimination code corresponding to the significant blocks other than the insignificant blocks and reproducing the interframe difference signal series by multiplication of the amplitude coefficient and adding of the mean value and making the interframe difference signal series to be zero for the insignificant block;

an adder for adding the interframe difference signal series reproduced after the vector quantization to the prediction signal series and reproducing the video signal and writing the video signal to the frame memory; and

a transmission data buffer for performing the variable length encoding of the significance/insignificance block discrimination code, the output vector discrimination code, the block mean value and the amplitude coefficient and controlling the threshold value to make the information generating amount constant.

4,710,813
LOW BANDWIDTH VIDEO TELECONFERENCING SYSTEM AND METHOD

Robert H. Wallis, Portola Valley, and William K. Pratt, Saratoga, both of Calif., assignors to Compression Labs, Inc., San Jose, Calif.

Continuation of Ser. No. 270,619, Jun. 4, 1981, abandoned. This application Jul. 31, 1986, Ser. No. 892,738

Int. Cl.⁴ H04N *7/12*

U.S. Cl. 358—136 **1 Claim**

1. A bandwidth compression method for frames of gray scale digital video image data including lines of pixels comprising,

calculating the two dimensional mean gray scale level of a predetermined plurality of pixels located about a pixel in question,

calculating the two dimensional activity level of a plurality of pixels relative to the pixel in question,

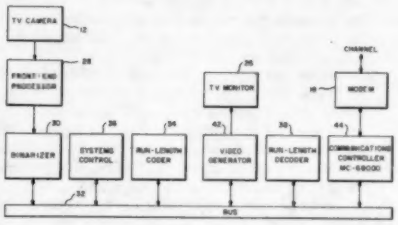
comparing a predetermined combination of the activity level and the mean to a threshold,

turning the pixel in question either black or white in response to the results of the comparison,

determining the intraframe correlation of the lines of the frame,

determining a first interframe correlation between the lines of the present frame and the corresponding lines of the previous frame,

generating a plurality of displaced versions of the previous frame, each displaced version being shifted by one or



more pixels in either the lateral, vertical or diagonal directions,

determining additional interframe correlations between the lines of the present frame and the corresponding lines of each of the displaced versions of the previous frame,

comparing the intraframe correlation and interframe correlations and selecting as a reference the frame having the best correlation with the present frame,

run length encoding in two dimensions the present frame with respect to the reference.

4,710,814
TELEVISION SOUND RECEIVING CIRCUIT FOR AT LEAST ONE SOUND CHANNEL CONTAINED IN AN RF SIGNAL

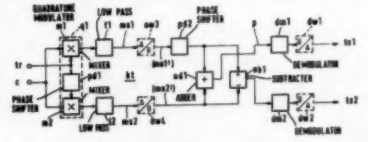
Gerhard G. Gassmann, Neuweiler-Agenbach; Hermannus Schat, Freiburg i.Br.; Herbert Elmis, Denzlingen; Bernd Novotny, Gundelfingen; Otmar Kappeler, Neuenburg, and Dietmar Ehrhardt, Freiburg i.Br., all of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Aug. 25, 1986, Ser. No. 899,973

Claims priority, application European Pat. Off., Aug. 27, 1985, 85110735.9

Int. Cl.⁴ H04N *7/04;* **G06G** *7/14;* **H03K** *5/00*

U.S. Cl. 358—143 **21 Claims**



1. A channel separating circuit for use in a television sound receiving circuit for at least one sound channel transmitted by means of a sound carrier and contained in an RF signal which also contains a composite color signal transmitted by means of a picture carrier and a chrominance subcarrier, said channel separating circuit comprising:

a single-sideband demodulator using the "phasing method" and having an output for a first sideband and an output for a second sideband, and comprising:

a first quadrature modulator to which a composite signal and a separating signal are fed as signals to be mixed, said composite signal containing a first composite sound carrier or a first composite sound carrier and a second composite sound carrier;

first and second low pass filters connected, respectively, to first and second outputs of said first quadrature modulator to provide a first mixer signal and a second mixer signal, the passband of each of said first and second low pass filters being at least equal to the bandwidth of a sound channel frequency modulated about its sound carrier in a base signal, the stop band of each of said first and second low pass filters being chosen to suppress signals on adjacent channels;

a 90° phase-shift stage having its input coupled to the output of said first low-pass filter;

a first adder having one input coupled to the output of said 90° phase-shift stage, a second input coupled to the output of said second low pass filter;

a first subtracter having a minuend input coupled to said 90° phase-shift stage output, a subtrahend input connected to said second low pass filter output;

a first frequency demodulator having its input coupled to the sum output of said first adder and having an output which is the sound signal of the first sound channel in the desired audio-frequency range; and

a second frequency demodulator having its input coupled to the output of said first subtracter and having an output which is the sound signal of the second sound channel in the desired audio-frequency range;

said RF signal being applied as the composite signal directly to said channel-separating circuit; and wherein

the frequency of said separating signal is set so that, in the presence of said first and second composite sound carriers, it lies approximately in the middle between the frequencies of said first and second composite sound carriers, and it has the same frequency deviation from the first composite sound carrier in the presence of only said first composite sound carrier.

4,710,815

APPARATUS FOR IMPROVING THE LINEARITY OF TV TRANSMITTERS USING A KLYSTRON

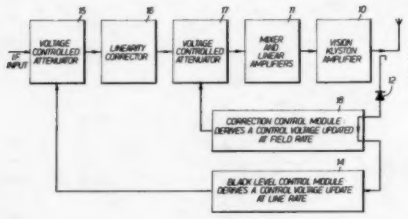
Peter G. Douglas, Chandler's Ford, and Morris N. Kyffin, Andover, both of England, assignors to Independent Broadcasting Authority, London, United Kingdom

Filed Feb. 5, 1985, Ser. No. 698,584

Claims priority, application United Kingdom, Feb. 6, 1984, 8403067

Int. Cl.[4] H04N *5/38*; H04B *1/04*

U.S. Cl. 358—186 **4 Claims**



1. A transmitter apparatus comprising a klystron circuit having an input and output, input signal conditioning circuitry having an input for signals to be transmitted and an output connected to the input of said klystron circuit for inputting conditioning signals thereto, a detector for detecting a modulating signal at the output of said klystron circuit and producing an output representative thereof, and a feedback circuit including a control circuit having an input connected to said detector, and an output connected to said input signal conditioning circuitry, said input signal conditioning circuitry comprising a linearity corrector means for affecting linearity correction of said klystron circuit and a further feedback circuit including a further control circuit having an input connected to said detector and an output connected to said input signal conditioning circuitry; said feedback circuit and said further feedback circuit coupled to said detector for evaluating the linearity of the output from the klystron circuit; and in response to the evaluated linearity of said klystron circuit to generate a correction signal dependent on a determined linearity, said linearity corrector means modifies said linearity of the klystron circuit in response to said correction signal.

4,710,816

PICTURE SIGNAL GENERATING APPARATUS

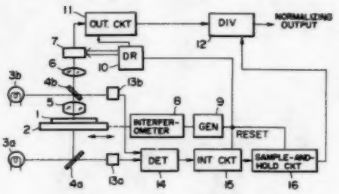
Seiichi Yabumoto, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Sep. 25, 1986, Ser. No. 911,356

Claims priority, application Japan, Sep. 30, 1985, 60-216781; Sep. 30, 1985, 60-216782

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.15 **10 Claims**



1. An apparatus for illuminating an object with illuminating means, providing a relative displacement between a linear image sensor and a pattern distribution of light from the object in a direction substantially perpendicular to an alignment direction of a plurality of photoelectric transducer elements constituting said linear image sensor, and controlling a picture signal of said image sensor according to the pattern distribution of light from the object, including:

(a) means for detecting the relative displacement and generating a displacement detection signal whenever a predetermined displacement occurs between said image sensor and the pattern distribution of light from the object;

(b) exposure detecting means having light-receiving means for receiving light from said illuminating means, said exposure detecting means being adapted to detect an exposure of said light-receiving means upon illumination of light from said illuminating means in response to the displacement detection signal and to generate an exposure detection signal representing the detected exposure; and

(c) normalizing means for normalizing the picture signal in response to the exposure detection signal.

4,710,817

SOLID STATE IMAGE SENSOR

Fumihiko Ando, Tokyo, Japan, assignor to Nippon Hoso Kyokai, Tokyo, Japan

PCT No. PCT/JP85/00710, § 371 Date Aug. 25, 1986, § 102(e) Date Aug. 25, 1986, PCT Pub. No. WO86/03918, PCT Pub. Date Jul. 3, 1986

PCT Filed Dec. 25, 1985, Ser. No. 900,139

Claims priority, application Japan, Dec. 26, 1984, 59-273144

Int. Cl.[4] H04N *5/14*

U.S. Cl. 358—213.11 **7 Claims**

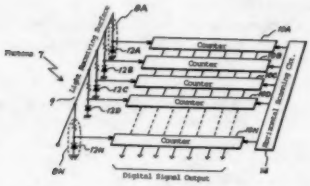
1. A solid state image sensor comprising:

a plurality of light receiving means arranged in the form of at least one dimension and each for delivering a pulse signal representative of the number of photons incident to each light receiving means;

a plurality of counting and holding means, each connected to a corresponding one of said light receiving means and

for counting said pulse signals and for holding a count value as a video output;

means for resetting said count value of each of said plurality



of counting and holding means to its initial state at a predetermined interval; and

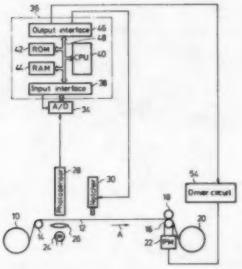
scanning means for sequentially reading out said count value from each of said counting and holding means.

4,710,818

METHOD OF READING IMAGE DATA

Kenichi Inatsuki, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 28, 1986, Ser. No. 890,243
Claims priority, application Japan, Aug. 8, 1985, 60-174725
Int. Cl.[4] H04N *3/40*
U.S. Cl. 358—214 **6 Claims**



1. A method of sensing image information wherein a film is fed by film driving feed means including a pulse motor, and image information from the film is sensed by a sensor, comprising the steps of:

storing values indicative of time periods corresponding to constant feeding lengths of said film during periods of acceleration and deceleration of said pulse motor; and

operating said sensor during feeding of said film by said pulse motor at time intervals defined by said values, wherein said sensor is operated at intervals corresponding to constant feeding lengths of said film.

4,710,819

SUSPENSION SYSTEM FOR SUPPORTING AND CONVEYING EQUIPMENT, SUCH AS A CAMERA

Garrett W. Brown, 515 Adison Ct., Philadelphia, Pa. 19147

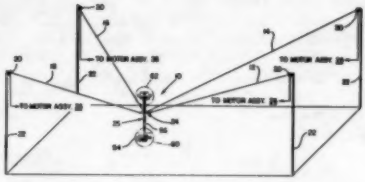
Continuation of Ser. No. 445,572, Dec. 1, 1982, abandoned. This application Jul. 30, 1985, Ser. No. 760,390
Int. Cl.[4] H04N *5/30*; B66C *21/00*; G03B *39/00*; B63C *11/10*
U.S. Cl. 358—229 **67 Claims**

1. A suspension system for supporting and conveying equipment, said system comprising:

at least three elongate, flexible members;

mounting means spaced-apart from each other for extendably and retractably supporting said flexible members;

an equipment support member attached to each of the flexible members, wherein the equipment support member is adapted to be moved in three directions in response to movement of the flexible members; and



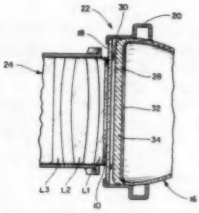
means for operatively connecting said equipment with said equipment support member so that said equipment is in controllable isolation from angular movement of said equipment support member.

4,710,820

SINGLE LAYER OPTICAL COUPLER FOR PROJECTION TV CRT

William N. Roberts, Niles, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed May 22, 1986, Ser. No. 866,185
Int. Cl.[4] H04N *5/74*
U.S. Cl. 358—231 **5 Claims**



1. In a projection television receiver wherein a video image is projected and displayed, an arrangement comprising:

a CRT having a window through which said video image is directed;

lens means aligned with said CRT for receiving said video image directed through the window thereof for projecting said video image;

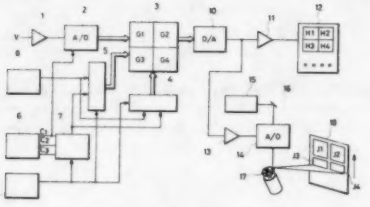
compressible, adhesive, solid, optical coupling means having a unitary structure and a characteristic adhesiveness and compressibility and including first and second flat opposed surfaces disposed in tight-fitting engagement with said CRT window and said lens means, respectively, wherein said optical coupling means is comprised of at least first and second silicone resins and at least first and second catalysts, and wherein said characteristic adhesiveness may be changed by varying the ratio of said silicone resins and said characteristic compressiblity may be changed by varying the ratio of said catalysts; and

mounting means for securely coupling said lens means to said CRT and for maintaining said optical coupling means in compression between said CRT window and said lens means.

4,710,821
IMAGE RECORDING APPARATUS

Shinichi Ohta, Kunitachi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 10, 1985, Ser. No. 743,352
Claims priority, application Japan, Jun. 14, 1984, 59-122746; Jun. 14, 1984, 59-122747; Jul. 24, 1984, 59-153688; Jul. 24, 1984, 59-153689; Jul. 24, 1984, 59-153690
Int. Cl.[4] H04N *1/00, 1/40*
U.S. Cl. 358—256 **14 Claims**

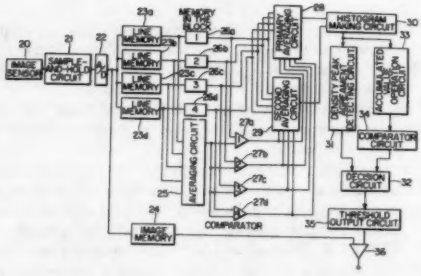


1. An image recording apparatus comprising:
a memory for storing a plurality of frames of image data;
recording means for reading out the frames of image data to be recorded from said memory and for recording a predetermined number of the frames of image data in a predetermined arrangement; and
display means for reading out the frames of image data from said memory and for displaying the read out image data from memory, in substantially the same predetermined arrangement as that for recording, and in such a predetermined compressed mode as to decrease the number of pixes within the frame as compared with that upon recording.

4,710,822
IMAGE PROCESSING METHOD

Masahiko Matsunawa, Hino, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 533,430, Sep. 16, 1983, abandoned. This application Aug. 21, 1986, Ser. No. 899,751
Claims priority, application Japan, Sep. 21, 1982, 57-164419
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—280 **5 Claims**

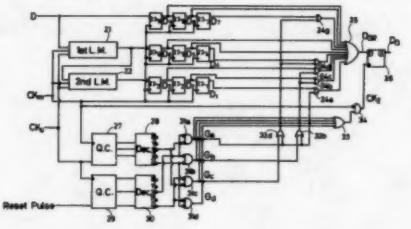


1. An image processing method comprising steps of:
dividing an image into a plurality of blocks, each block comprises a plurality of picture elements;
sorting the picture elements in each block into a first group consisting of picture elements of densities not lower than a reference density and a second group consisting of picture elements of densities lower than said reference density;
obtaining a representative density of picture elements of said first group in each block;
obtaining a representative density of picture elements of said second group in each block;
effecting an image discrimination in accordance with said representative densities;
effecting a determination of threshold value in accordance with said representative densities and result of said image discrimination;
said image discrimination and determination of threshold values are conducted by using histograms made out from said representative density of picture elements of said first group in each block and said representative density of picture elements of said second group in each block; and
converting image information into binary signals according to said threshold value.

4,710,823
DENSITY CONVERSION IN IMAGE REPRODUCTION

Yoshihiro Kitazawa, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed May 7, 1985, Ser. No. 731,514
Claims priority, application Japan, Jun. 8, 1984, 59-118721
Int. Cl.[4] H04H *1/40*
U.S. Cl. 358—280 **8 Claims**



1. A method for converting density in image reproduction, comprising the steps of:
scanning an original to obtain binary image data;
distributing into several groups binary image data of several pixels to be recorded two dimensionally in main and sub-scanning directions;
obtaining a logical sum of the image data belonging to each of the pixel groups to generate a recording signal; and
modulating an output device using the recording signal to produce a reproduction image,
wherein image data of five by five pixels in the main and the sub-scanning directions are distributed into four groups by a ratio of three to two in both the main and sub-scanning directions.

4,710,824
SYSTEM AND METHOD FOR IMPROVING CHROMINANCE IN VIDEO DISC STORAGE SYSTEM

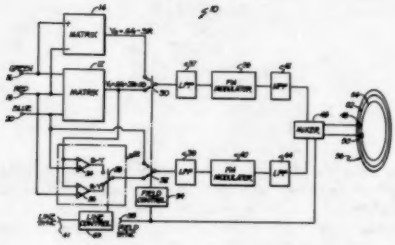
Lawrence E. Alston, Chelmsford, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 4, 1986, Ser. No. 848,156
Int. Cl.[4] H04N *9/80*
U.S. Cl. 358—310 **21 Claims**

1. A system for encoding a video signal into a format suitable for recording wherein the video signal is of the type comprising at least three separate color component signals comprising:
first means for providing a first luminance type output signal as a function of the sum of select portions of the three separate color component signals;
second means for providing a second luminance type output signal as a function of the difference between select portions of two of the three separate color component signals;
third means for providing a chrominance type output signal

as a function of the respective differences between said first luminance type signal and at least two of the separate color component signals; and

fourth means responsive to the output signals from said first, second and third means and the video signal for providing: said first luminance type signal in correspondence with first alternate fields of the video signal in a format suitable for recording within a first select bandwidth; said second luminance type signal in correspondence with second



alternate fields disposed between every other field of said first alternate fields of the video signal in a format suitable for recording within said first select bandwidth, said chrominance type signal in correspondence with said first alternate fields of the video signal in a format suitable for recording within a second select bandwidth below said first select bandwidth, and one select separate color component signal in correspondence with said second alternate fields in a format suitable for recording within said second select bandwidth.

4,710,825

DISC RECORDING SYSTEM WITH SPEED CONTROL

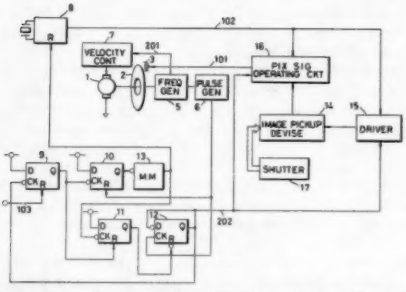
Masaya Okita, Yokohama; Masahiro Sawada, Kawasaki, and Tadashi Ota, Tokyo, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Continuation of Ser. No. 612,689, May 22, 1984, abandoned. This application Dec. 8, 1986, Ser. No. 939,225

Claims priority, application Japan, May 26, 1983, 58-93121; Jul. 14, 1983, 58-126860; Jul. 14, 1983, 58-126861

Int. Cl.[4] H04N *5/781*

U.S. Cl. 358—342 **17 Claims**



1. A system for controlling rotation velocity of a motor comprising:

(a) first pulse generating means for generating a predetermined number of pulses for every revolution of said motor, the period of the pulses from said means being inversely proportional to the rotation velocity of said motor;

(b) second pulse generating means for generating a plurality of pulses having a predetermined phase difference with respect to the pulses from said first pulse generating means, each of said pulses from said second pulse generating means having a predetermined period in which the level of said pulses from said second pulse generating means varies linearly;

(c) first sample and hold means for sampling and holding the pulse from said second pulse generating means in synchronism with the pulse from said first pulse generating means;

(d) second sample and hold means for sampling and holding the pulse from said second pulse generating means within said predetermined period in synchronism with the pulse from said second pulse generating means; and

(e) means for controlling the rotation velocity of said motor in accordance with the difference between the value of the pulse from said second pulse generating means sampled and held by said first and second sample and hold means, respectively.

4,710,826

APPARATUS WITH LIQUID CRYSTAL DISPLAY PANEL, FOR RECORDING/PLAYING BACK TELEVISION SIGNAL BY UTILIZING DIGITAL AUDIO TAPE RECORDER SYSTEM

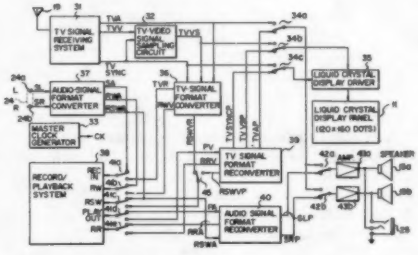
Keiichi Sakurai, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1986, Ser. No. 872,224

Claims priority, application Japan, Jun. 18, 1985, 60-132419

Int. Cl.[4] H04N *5/92*

U.S. Cl. 360—9.1 **20 Claims**



18. An apparatus for recording/playing back a signal with a sync signal by using a digital audio tape recorder (DAT) system, comprising:

first control signal generating means for generating first and second control signals according to the sync signal to record the input signal;

converting means for converting an input signal to a PCM signal having a predetermined bit length within 256 bits and a predetermined block size within 256 blocks in response to the first and second control signals;

DAT tape driving means for driving a rotary head in response to a fourth control signal of a frequency based on that of a selected one of the first control signal and a third control signal based on the DAT tape drive instruction, outputting the playback digital signal from said DAT tape in response to a read instruction in the DAT tape drive instruction, and writing an input recording digital signal on said DAT tape in response to a write instruction in the DAT tape drive instruction;

PCM signal recording/playback processing means for receiving the PCM signal converted according to the first and second control signals, supplying the recording digital signal derived from the PCM signal to said DAT tape driving means in response to the fourth control signal, receiving the playback digital signal from said DAT tape driving means in response to the fourth control signal, and outputting a playback PCM signal derived from the play-

back digital signal in response to the third control signal and a fifth control signal;

second control signal generating means for generating the third and fifth control signals and the playback sync signal to playback the playback PCM signal; and

reconverting means for reconverting the playback PCM signal from said PCM signal recording/playback processing means to the same signal as input to said converting means.

4,710,827

SERVO APPARATUS

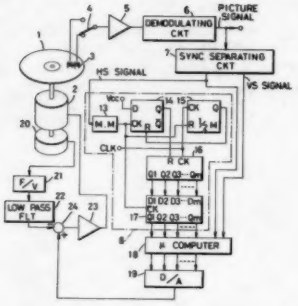
Masaya Okita, Yokohama, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed May 21, 1986, Ser. No. 865,415

Claims priority, application Japan, May 29, 1985, 60-116282

Int. Cl.[4] H04N *5/78*; G11B *15/52*

U.S. Cl. 360—10.1 **13 Claims**



7. A method for controlling an apparatus that repeatedly reproduces a picture signal from a motor-driven disk, comprising the steps of:

(a) providing memory means;

(b) providing supplying means for supplying voltage to control the rotation of said motor;

(c) providing control means for controlling said supplying means to change said voltage;

(d) successively producing horizontal synchronizing signals separated from the reproduced picture signal;

(e) measuring time intervals at which said horizontal synchronizing signals are produced and outputting time-interval data indicative of a plurality of measured time intervals;

(f) storing in said memory means time-interval data corresponding to at least one field of the picture signal;

(g) producing control data which determine the change of said voltage during the reproduction of at least one field of the picture signal, on the basis of said time-interval data stored in said memory means, storing said control data in said memory means, and causing said control means to control said supplying means on the basis of said control data stored in said memory means; and

(h) repeating the steps (d), (e), (f), and (g) until all of said measured time intervals are within a predetermined range.

4,710,828

TRACKING ALIGNMENT FOR A ROTATING MAGNETIC TRANSDUCER HEAD

Jean F. Sulzer, Sevres, France, assignor to Enertec, Sevres, France

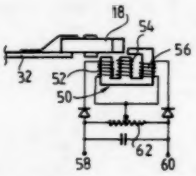
Filed Jun. 5, 1985, Ser. No. 741,515

Claims priority, application France, Jun. 28, 1984, 84 1023

Int. Cl.[4] G11B *21/02, 5/58*

U.S. Cl. 360—75 **15 Claims**

14. In a transducer of the type including a magnetic transducer head mounted to the end of a rotating support, the support being relatively inflexible in its plane of rotation and relatively flexible in a direction transverse to its plane of rotation, a method of modifying the trajectory of the rotating magnetic transducer head with respect to its plane of rotation



comprising the steps of: (a) periodically applying a magnetic field directly to the magnetic transducer head and transverse to and within the plane of rotation; and (b) responsive to said magnetic field inducing said head to oscillate in a direction transverse to the plane of rotation.

4,710,829

DISK LOADING MECHANISM FOR RECORDING AND REPRODUCING APPARATUS

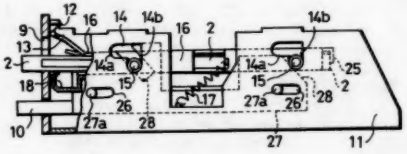
Motohiro Shimaoka, and Yukio Saito, both of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

Continuation of Ser. No. 569,671, Jan. 10, 1984, abandoned. This application Jan. 13, 1987, Ser. No. 4,839

Claims priority, application Japan, Jan. 11, 1983, 58-1296[U]

Int. Cl.[4] G11B *5/012*

U.S. Cl. 360—97 **4 Claims**



1. A recording and reproducing apparatus comprising:

a body having an opening at a forward portion thereof to allow insertion of a disk cartridge into the apparatus;

a movable cartridge holder disposed inwardly of the opening at an insertion position for receiving a disk cartridge inserted through the opening;

means within the apparatus for moving the cartridge holder inwardly and downwardly to an operative position within the apparatus when the cartridge has been fully inserted in the holder, and for moving the holder upwardly and forwardly to the insertion position when the cartridge is to be ejected;

a pivotable shutter having an end pivotally mounted to the body of the apparatus on one side of the opening and having its free end pivotally movable to close at least a portion of the opening;

means biasing the shutter to close said portion of the opening when the cartridge is removed from the holder and withdrawn through the opening; and

a receiving portion on the forward end of the holder which is disposed on an opposite side of the opening from the shutter when the holder is in the insertion position, said receiving portion having an end which is pressed back upon insertion of the cartridge into the holder and, when the cartridge is to be ejected, said end of the receiving portion springing forward and being engaged on an inner surface thereof by the free end of the pivotable shutter as the cartridge is withdrawn from the holder through the

opening such that the opening is closed by the combination of said shutter and said receiving portion,

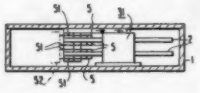
whereby said receiving portion of the cartridge holder engaged on its inner surface by the end of the shutter at the insertion position prevents movement of the holder to the operative position unless a disk cartridge is first inserted in the holder to push said pivotable shutter back away from engagement with the inner surface of said end of said receiving portion.

4,710,830

SEALED DISC DRIVE ASSEMBLY WITH INTERNAL AIR FILTER

Hiroshi Imai, and Kouichi Yoshioka, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 921,504
Claims priority, application Japan, Oct. 24, 1985, 60-238660
Int. Cl.[4] G11B *5/012*
U.S. Cl. 360—97 **4 Claims**



1. A disc drive assembly, comprising:

(a) a hermetically sealed housing (1),

(b) at least one hard magnetic storage disc (2) disposed within the housing and coupled to rotational drive means (31),

(c) an air filter (45; 46; 47) disposed within the housing with an intake side (451; 461; 471) thereof oriented directly in the path of and perpendicular to a spiralling, centrifugally pumped air flow generated by the rotating disc, and

(d) an air guide (71; 72; 73) disposed within the housing for ducting clean air from an outlet side (452; 462; 472) of the filter to a low pressure zone proximate the center of the disc such that a pressure differential is established across the filter to promote a continuous cyclical air flow therethrough and the attendant removal of contaminating particles of dust and the like, wherein the intake side of the filter extends over substantially the full height of the housing, and further comprising a flue box (41; 42; 43) disposed within the housing enclosing the outlet side of the filter and establishing open communication with an inlet of the air guide.

4,710,831

LOADING AND UNLOADING SYSTEM FOR FLEXIBLE DISC DRIVE APPARATUS

Akimasa Nishimura, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 11, 1984, Ser. No. 659,703
Claims priority, application Japan, Oct. 19, 1983, 58-195507
Int. Cl.[4] G11B *17/035, 5/016, 15/64*
U.S. Cl. 360—99 **9 Claims**

7. A recording and/or reproducing apparatus using a disc-shaped flexible record-bearing medium, comprising:

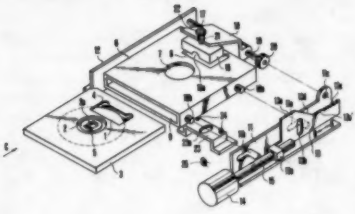
(a) a recording and/or reproducing head arranged to selectively confront a recording surface of the medium;

(b) a stabilizing means for stabilizing the medium near said head, said stabilizing means having three positions:

a first position at which said medium is stabilized near said head,

a second position at which said medium is not stabilized, and which is apart from said medium by a predetermined distance, and

a third position at which said medium is not stabilized and which is more apart from said medium than said second position; and



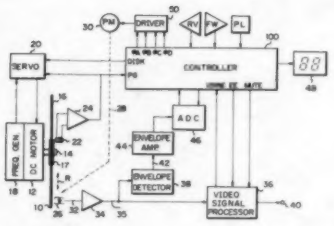
(c) control means for holding said stabilizing means selectively at said first position for recording and/or reproducing, at said second position for preventing deformation of said medium, or at said third position for allowing ejection of said medium.

4,710,832

TRACKING SYSTEM FOR ROTARY MAGNETIC RECORDING MEDIUM USING WEIGHTED SAMPLED TRACK VALUES

Haruo Itoh, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 5, 1984, Ser. No. 658,440
Claims priority, application Japan, Oct. 14, 1983, 58-190631
Int. Cl.[4] H04N *5/781*
U.S. Cl. 360—10.2 **8 Claims**



1. A tracking system for a rotary magnetic recording disc having a plurality of tracks recorded concentrically thereon, comprising:

driving means having a driving shaft which is removably loaded with said rotary magnetic recording disc for rotatably driving said disc;

magnetic transducer means for sensing signals recorded on said tracks of said magnetic recording disc;

transducer feeding means for feeding said magnetic transducer means to a position where one desired track is located; and

control means for controlling said transducer feeding means to effect tracking,

said control means including operational means for sampling a signal sensed by said magnetic trasnducer means in response to the rotation of said magnetic recording disc at a plurality of sampling points generally distirbuted along the track, and summing the sampled values with predetermined weight according to the location of the sampling point along the track to produce a weighted addition result,

said operational means including means for determining a difference between a present result of weighted addition

and an immediately preceding weighted addition result and producing a difference signal if the difference exceeds a first predetermined value,

said control means executing a tracking control on said transducer feeding means in response to the produced difference signal to cause said magnetic transducer means to move to a position where a larger weighted addition result is determined,

said control means controlling said transducer feeding means to cause said magnetic transducer means to remain at a position where said magnetic transducer means is located when said means for determining determines that a difference between a present result of weighted addition from an immediately preceding of weighted addition is associated with a peak of said signal recorded on said track.

4,710,833

FLOPPY DISK R/W HEAD ASSEMBLY

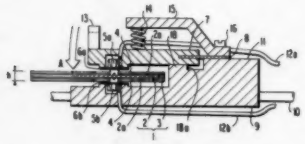
Tadashi Hasegawa, Koriyama, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1985, Ser. No. 805,826

Claims priority, application Japan, Feb. 27, 1985, 60-38174

Int. Cl.[4] G11B *5/54*

U.S. Cl. 360—105 **4 Claims**



1. A movable magnetic head assembly simultaneously cooperable with opposite sides of a magnetic storage disk (2), comprising:

(a) an elongate carriage (9) radially movable relative to the disk and having a pedestal (11) upstanding from a radially outer end thereof,

(b) an elongate loading arm (7) pivotally mounted to the pedestal, extending parallel to the carriage to define therewith a disk receiving slot, and radially movable with the carriage,

(c) spring means (8) biasing the loading arm towards the carriage,

(d) first and second signal transducer heads (5*a*, 5*b*) respectively mounted opposite and facing each other to radially inner portions of the carriage and loading arm by respective gimbal springs (6*a*, 6*b*), and

(e) stop means (18; 19; 20) disposed intermediate the transducers and the pedestal and between said loading arm and said carriage at a position radially outwardly and spaced from an outer circumference of the disk for preventing the pivotal movement of the loading arm towards the carriage by the spring means beyond a predetermined position whereat the transducer heads pinchingly engage the opposite sides of the disk with a predetermined tracking force determined exclusively by the gimbal springs, said stop means defining an inner end of the disk receiving slot.

4,710,834

APPARATUS FOR POSITIONING A MAGNETIC DISK READ HEAD WITH PULSE OPERATED DETENT MAGNET

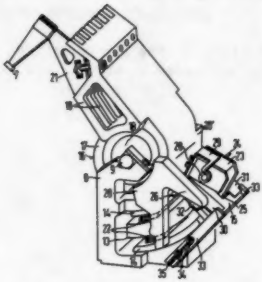
Wilhelm Brand, Rosenheim; Vaclav Vanek, Haar, and Franz Jakobec, Unterhaching, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 26, 1985, Ser. No. 749,312

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1984, 3423502

Int. Cl.[4] G11B *5/59*

U.S. Cl. 360—105 **14 Claims**



1. A positioning mechanism for a magnetic disk storage device of the rotational positioner type, comprising a bearing block for mounting a positioning shaft, a swivel unit rotatable about said shaft, said bearing block forming part of a motor system for rotating said swivel unit, said swivel unit comprising a pivot member rotationally seated on said shaft and having pivot arms carrying magnetic heads and brackets for carrying the movable member of the motor system for the rotational positioner, a detent electro-magnet having a solenoid and a stop armature movable between an operating position which is juxtaposed with said pivot member when said pivot member is in a detent position for selectively restraining movement of said pivot member when it has been moved to said detent position and an inoperated position for enabling the first member to rotate freely, said detent magnet solenoid comprisiing an electrical pulse operated solenoid, said stop armature being adapted to move away from said pivot member to its inoperative position in response to a brief excitation of said detent magnet to enable said pivot member to rotate freely, and means for mechanically holding said stop armature in its operating position as long as said pivot member does not swing back into said detent position.

4,710,835

MAGNETIC HEAD DRIVING MECHANISM FOR TAPE PLAYER

Fumiya Yamada; Seiichiro Matsuki; Masahiko Kawamura, and Masashi Kawamoto, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 13, 1985, Ser. No. 775,977

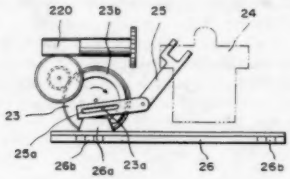
Claims priority, application Japan, Sep. 14, 1984, 59-138757; Sep. 20, 1984, 59-141580; Sep. 20, 1984, 59-141581; Sep. 20, 1984, 59-141583; Sep. 25, 1984, 59-143614

Int. Cl.[4] G11B *21/08*

U.S. Cl. 360—106 **1 Claim**

1. In an auto-reverse type tape player, a head rotation mechanism for rotating a rotary head in said tape player, said mechanism comprising a sector gear; a boss extending in the direction opposite to the rotary head side of the sector gear and having a tapered foreend; a slide lever; a cam crest positioned on said slide lever; a cam gear having a pin and a semicircular cam each extending from a major surface thereof, said cam gear

being positioned with respect to said slide lever and said crest so that said semicircular cam is contactible with said cam crest; linking means for rotating the rotary head, including a link having two arms which are pivotably connected at one end of each other, one of said arms having a groove in which said pin is slidable, the linking means being rocked by said gear and having its other arm equipped with a U-shaped member engaging with the boss on the sector gear, wherein the boss on the sector gear engages with the U-shaped member of said linking means for rotating the head only when the rotary head is located at a retracted position, and the boss is out of contact with the U-shaped member when the rotary head is located ahead of the retracted position, whereby a reversible rotation of the single cam gear is used to change a direction of the rotary head and move the head forward.

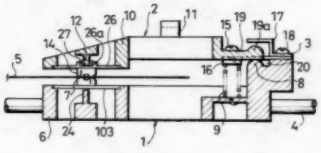


4,710,836

MAGNETIC HEAD

Yuichi Hishi, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Jan. 23, 1986, Ser. No. 821,596
Claims priority, application Japan, Jan. 23, 1985, 60-7477[U]
Int. Cl.[4] G11B *5/54, 5/016, 5/58*
U.S. Cl. 360—106 **3 Claims**



1. A magnetic head capable of reading information from or writing information on both sides of a magnetic disc inserted therein, comprising:

a carriage slidably supported on a guide rod so as to be slidable in the radial direction of the magnetic disc;

an arm joined at the rear end thereof through an elastic member to the rear end of the carriage so as to be swingable on the elastic member;

an upper head fixed to the free front end of the arm;

a lower head mounted through a gimbal spriing on the carriage opposite to the upper head;

resilient means urging the arm toward the carriage so that the upper head is pressed against the lower head;

a pivot defining the vertical position of the upper head with respect to the arm;

a pivot defining the vertical position of the lower head with respect to the carriage; and

a holding member for inhibiting the excessive upward turning of the arm,

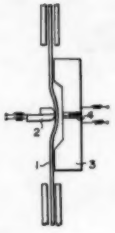
wherein said carriage has a supporting portion on the rear end thereof for abutting a lower surface of the rear end of the arm in order to define a stable vertical position of the arm when it is lowered toward the carriage so as to form a stable reference plane for the free end of the arm in which the upper head is located, whereby the vertical positions of the upper head and the lower head can be simply adjusted.

4,710,837

MAGNETIC HEAD DEVICE INCLUDING MAGNETIC MEDIA BIASING AND POSITIONING MEANS

Takashi Matsumoto, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Japan

Filed Jun. 20, 1985, Ser. No. 746,963
Claims priority, application Japan, Jun. 27, 1984, 59-132256
Int. Cl.[4] G11B *17/32, 21/21*
U.S. Cl. 360—110 **3 Claims**



1. A magnetic head device comprising:

a thin-film magnetic recording and reproducing head, said thin-film magnetic recording and reproducing head applying a longitudinal magnetic field to a magnetic recording medium during a recording mode;

positioning means for keeping said thin-film magnetic recording and reproducing head in contact with said magnetic recording medium, said thin-film magnetic recording and reproducing head and said positioning means being located on opposite sides of said magnetic recording medium; and

a biasing magnetic head for applying a longitudinal biasing magnetic field to the magnetic recording medium during the recording mode, said biasing magnetic head being mounted in said positioning means in confronting relation to said thin-film magnetic recording and reproducing head with the magnetic recording medium adapted to be interposed therebetween.

4,710,838

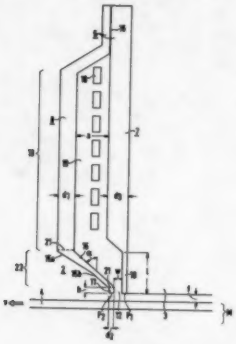
MAGNETIC THIN-FILM HEAD FOR A RECORDING MEDIUM THAT CAN BE MAGNETIZED VERTICALLY

Andreas Jahnke, Forchheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Dec. 11, 1985, Ser. No. 807,538
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446924
Int. Cl.[4] G11B *5/127*
U.S. Cl. 360—125 **8 Claims**

1. A magnetic thin-film head comprising a layer-wise build-up on a nonmagnetic substrate for a recording medium which is provided with a magnetized storage layer, into which information can be written along a track by perpendicular magnetization of the storage layer, said magnetic head comprising a ring head-like magnetic conduction body for carrying magnetic flux having two magnet legs, a first of the magnet legs being disposed on the substrate and a second of the magnet legs being spaced from the first magnet leg by a defined space, the magnet legs forming end pole pieces facing the recording medium arranged one behind the other as viewed in the direction of motion of the head and medium, the end pole pieces having a predetermined small spacing therebetween and having a predetermined small width transverse to the direction of motion, said defined space between the magnet legs being

substantially larger than the spacing between the end pole pieces, the second magnet leg being formed so as to provide the defined space, the turns of a write/read coil winding extending through said defined space, the end pole piece associated with the second magnet leg having a predetermined short vertical length, the corresponding vertical length of the other end pole piece being at least twice as large as said predetermined short vertical length of the end pole piece associated



with the second magnet leg, the second magnet leg being formed with a leg part which has an increasing width in a region between the associated end pole piece and the region of the second magnet leg which defines said defined space, the leg part being provided with an aperture which extends along a center line of the second magnet leg lying in the conduction direction of the magnetic flux and reaches at least approximately to the end pole piece associated with the second leg.

4,710,839

MAGNETIC DISC CARTRIDGE

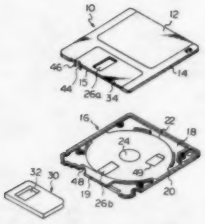
Michio Iizuka, Saku, and Haruo Shiba, Komoro, both of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Nov. 27, 1985, Ser. No. 803,205

Claims priority, application Japan, Dec. 5, 1984, 59-184867[U]

Int. Cl.[4] G11B *23/033*

U.S. Cl. 360—133 **4 Claims**



1. A magnetic disc cartridge adapted for use with a magnetic disc drive apparatus having a housing to receive said cartridge, a read-write head and a shutter actuation pin, said magnetic disc cartridge comprising a magnetic disc, a pair of upper and lower case members, superimposed one upon the other, to define a generally flat case for accomodating said magnetic disc therein, said case having a center axis and a peripheral wall, said upper and lower case members having peripheral edges which form said peripheral wall, with a seam line formed between said case members and upon said peripheral wall when said case members are superimposed one upon the other, a means for defining an aperture in said case between said center axis and said peripheral wall for access of said read-write head to said magnetic disc, a shutter moveably mounted on said case and engageable with said shutter actuation pin to move between a first position in which said shutter closes said aperture and a second position in which said shutter opens said aperture, and a means for defining a groove on said peripheral wall of said case, said groove extending through the case in parallel to said center axis to receive said shutter actuation pin when said shutter is in said second position, wherein said means for defining said groove comprises a cut-out section in one of said case members along the peripheral edge thereof, and a wall member defining said groove and extending integrally from the other of the upper and lower case members along the peripheral edge thereof, said wall member extending into said cut-out section so that said groove contains no seam line, whereby catching of said shutter actuation pin upon said seam line is precluded.

4,710,840

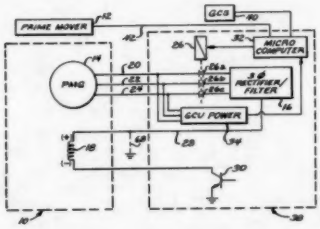
GENERATING SYSTEM WITH FAULT DETECTION

John E. Shepler, and Dov Zur, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Jan. 8, 1985, Ser. No. 689,765

Int. Cl.[4] H02H *7/06*

U.S. Cl. 361—20 **8 Claims**



1. In a generating system, the combination of: a permanent magnet generator characterized by an output whose voltage is inversely affected by its loading;

an exciter receiving electrical power from said permanent magnet generator and generating a magnetic field, said exciter including a winding;

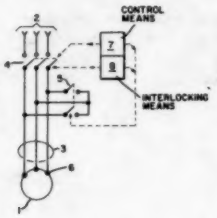
an electrically controllable switch selectively connecting or disconnecting said winding to or from said permanent magnet generator and powered by said permanent magnet generator; and

a fault detector operating said switch including an electrical computing circuit powered by said permanent magnet generator and characterized by inability to operate at low output voltage levels of said permanent magnet generator caused by heavy loading thereof indicative of a fault in said exciter winding and a non-volatile memory in which is written information indicative of the inability of said computing circuit to operate in response to a said low voltage level, said computing circuit, upon restoration to ability to operate in response to an output voltage increase from said low voltage level, reading said memory in response thereto, and controlling said switch to prevent connection of said winding to said permanent magnet generator.

4,710,841
SYSTEM FOR PRODUCTION OF INDUCTION MACHINES AGAINST DAMAGE FROM RESIDUAL VOLTAGE EFFECTS

Gerald W. Bottrell, 2442 Teasley St., La Crescenta, Calif. 91214

Filed Oct. 23, 1985, Ser. No. 790,151
Int. Cl.[4] H02H *7/08*
U.S. Cl. 361—23 18 Claims



1. A system for protection of an induction machine, comprising:

a voltage source switching means for connection to a voltage source;

a short-circuiting switch for connection to induction machine supply conductors, between said voltage source switching means and the terminals of said induction machine, in such a manner that said supply conductors are short circuited when said short-circuiting switch is closed;

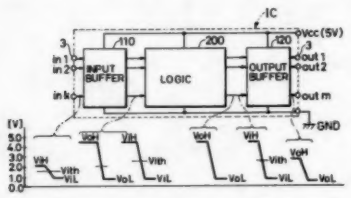
control means for closing said short-circuiting switch after said voltage source is interrupted, said short-circuiting switch being held closed for a predetermined period of time and, at the end of said predetermined period of time, said short-circuiting switch being opened, thereby enabling said voltage source to be re-established; and

an interlocking system to prevent closing said voltage source switching means unless said short-circuiting switch is open and to prevent closing said short-circuiting switch unless said voltage source switching means is open.

4,710,842
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Yasunaga Suzuki; Toshiaki Matsubara, and Akira Uragami, all of Takasaki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 18, 1986, Ser. No. 840,655
Claims priority, application Japan, Mar. 25, 1985, 60-58366
Int. Cl.[4] H02H *3/00*
U.S. Cl. 361—88 15 Claims



1. An integrated circuit comprising:

(1) a substrate having a main surface;

(2) a plurality of bonding pads formed at said main surface;

(3) a plurality of input circuit forming portions and a plurality of output circuit forming portions formed at said main surface in such a manner as to form pairs that each correspond respectively to one of a plurality of said bonding pads, each input circuit forming portion and each output circuit forming portion having predetermined elements;

(4) a plurality of input circuits formed in selected input circuit forming portions among said plurality of input circuit forming portions by electrically connecting said predetermined elements in said selected input circuit forming portions, each input circuit having an input and an output;

(5) a plurality of output circuits formed in selected output circuit forming portions among said plurality of output circuit forming portions by electrically connecting said predetermined elements in said selected output circuit forming portions, which said selected output circuit forming portions are different from the output circuit forming portions formed so as to correspond to said selected input circuit forming portions, each output circuit having an input and an output;

(6) an internal circuit disposed on said main surface in such a manner as to receive at input terminals thereof the output signals of said plurality of input circuits and to generate at output terminals thereof output signals that drive the inputs of said plurality of output circuits; and

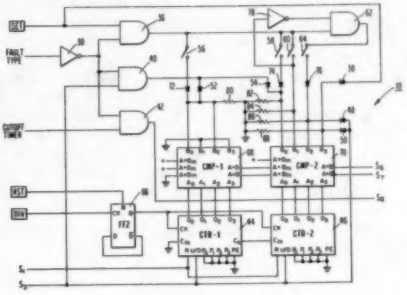
(7) input protection means for protecting an input stage of each respective input circuit from an external surge, said input protection means having a terminal connected to said input of said input circuit,

wherein each of said input protection means is formed by an output circuit forming portion corresponding to said selected input circuit portion by electrically connecting selected predetermined elements in the output circuit forming portion to form the input protection means.

4,710,843
SELECTABLE INTEGRATING CHARACTERISTIC TIMER

Thomas B. Breen, Landsdowne, Pa., assignor to General Electric Company, King of Prussia, Pa.

Filed Dec. 27, 1985, Ser. No. 813,793
Int. Cl.[4] H02H *3/093*
U.S. Cl. 361—96 7 Claims



1. A characteristic timer for use with a protective relay, which timer receives an applied signal comprising a pulse train, each pulse thereof having a pulse width which is representative of normal or fault conditions of a portion of an AC transmission line associated with a protective relay, said timer comprising:

(a) means for receiving a cut off time signal which establishes a cut off time period;

(b) means for receiving a fault type signal which indicates the occurrence of at least a first type of fault condition; and

(c) means acting upon occurrence of said first type fault condition and during said cut off time period for:

(i) measuring the magnitude of the width of each pulse in said applied signal;

(ii) determining an integrated magnitude of pulse widths which exceed a predetermined check level; and

(iii) generating an output signal whenever the pulse width

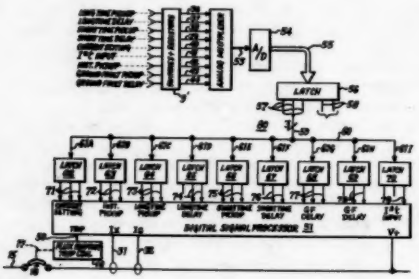
magnitude or the integrated pulse width magnitude exceeds a first predetermined operate level magnitude.

4,710,844

ELECTRONIC CIRCUIT BREAKER TRIP FUNCTION ADJUSTING CIRCUIT

Graham A. Scott, Avon, and Alan J. Messerli, Naugatuck, both of Conn., assignors to General Electric Company, New York, N.Y.

Continuation-in-part of Ser. No. 760,224, Jul. 29, 1985, abandoned. This application Aug. 11, 1986, Ser. No. 895,400
Int. Cl.[4] H02H 7/00
U.S. Cl. 361—96 **18 Claims**



1. An electronic circuit interrupter comprising:
current sensing means arranged around a bus conductor within a protected circuit and providing an output current in proportion to current through said protected circuit;
first circuit means including a first signal processor connected with said current sensing means for determining overcurrent conditions of first predetermined magnitudes and connected with a trip actuating coil initiating first time delays prior to providing a first tripping signal to said trip actuating coil to separate a pair of separable contacts serially connected within said bus conductor and controlled by said trip actuating coil;
first pickup setting means connected with said first circuit means for providing numeric values representing said first predetermined magnitudes, said first pickup setting means including a first binary encoded switch;
second circuit means for determining overcurrent conditions of second predetermined magnitudes and initiating second time delays prior to providing a second tripping signal to said trip actuating coil to separate said contacts said first binary encoded switch being encoded as depicted in FIG. 7B.

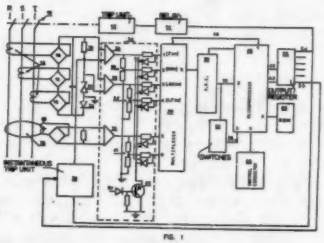
4,710,845

CIRCUIT BREAKER WITH SOLID-STATE TRIP UNIT WITH SAMPLING AND LATCHING AT THE LAST SIGNAL PEAK

Pierre Demeyer, Uriage, France, assignor to Merlin Gerin S.A., France

Filed Feb. 10, 1986, Ser. No. 827,438
Claims priority, application France, Feb. 25, 1985, 85 03159
Int. Cl.[4] H02H 3/08
U.S. Cl. 361—96 **7 Claims**

1. A digital solid-state trip-unit for an electrical circuit-breaker comprising:
current sensor means for generating analog current signals proportional to respective currents flowing through conductors protected by said circuit-breaker;
rectifier means for rectifying said current signals and for producing an analog signal representative of an instantaneous maximum value of said currents;
analog-to-digital converter means connected to said rectifier means for sampling said analog signal at a sampling period and for converting said analog signal to a sampled digitized signal;
microprocessor-based digital processing means connected to said analog-to-digital converter means including:
means for comparing, once during each processing cycle of said processing means, said sampled digitized signal with a latched peak value stored in said processing means,
means for replacing said stored value by said sample digitized signal and for setting a stored countdown period to a predetermined maximum value which is greater than one period of the analog current signals, if said means for comparing determine that said sampled digitized signal is greater than said stored latched peak value,



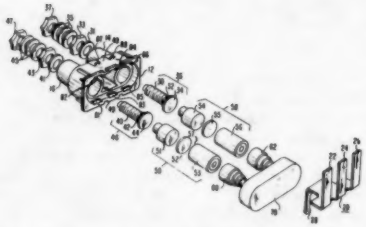
means for decrementing the stored countdown period if the countdown period is not equal to zero and if said means for comparing determines that said sampled digitized signal is less than said stored latched peak value,
means for erasing the stored latched peak value if the stored countdown period is equal to zero and if said means for comparing determines that said sampled digitized signal is less than said stored latched peak value, and
means for providing a circuit-breaker tripping order after a long time delay or after a short time delay, when said stored latch peak value exceeds respective predetermined levels; and
circuit-breaker trip means activated by said tripping order.

4,710,846

MODULAR PROTECTOR FOR TELECOMMUNICATIONS EQUIPMENT

Robert F. Heisinger, Parsippany-Troy Hills Township, Morris County, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 776,484, Sep. 16, 1985, abandoned. This application Apr. 15, 1987, Ser. No. 40,709
Int. Cl.[4] H02H 3/22
U.S. Cl. 361—119 **24 Claims**



1. Apparatus for protecting equipment connected to a tele-

phone line and for protecting persons using said equipment against spurious voltages and spurious currents said apparatus comprising

(1) a housing, said housing comprising a base, a landing, first and second wells between said base and said landing, each of said wells having an end elevated above said landing by a predetermined height and an opening through each end, the base of said housing having a trough surrounding the interior walls of said wells,

(2) first and second terminals, said terminals housed within said first and second wells, respectively, said terminals forming a substantially air tight seal with said ends, and said terminals projecting through said openings,

(3) first and second protectors introduced through an opening in said base and housed within said first and second wells respectively and communicating with said first and second terminals,

(4) first and second springs communicating with said first and second protectors,

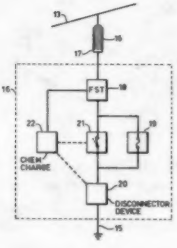
(5) a base cup, said base cup substantially covering said open base and retaining said first and second springs in said first and second wells respectively said base cup lodged within said trough, trapping an air pocket within said housing and forming a substantial seal with said housing, and

(6) means for grounding said spurious signals from said first and second terminals, said grounding means comprising a plurality of tines, said tines retaining said base cup in position by penetrating apertures in opposite walls of said housing to form a tight seal, said grounding means further comprising means for securing said grounding means to a binding post of an adaptor.

4,710,847
CURRENT-LIMITING SURGE ARRESTER DISCONNECTOR

Juri Kortschinski, 1414 Lochlin Trail, Mississauga, Ontario, Canada L5G 3V3; Michael V. Lat, 1431 Monaghan Circle, Mississauga, Ontario, Canada L5C 1R7; Claude G. Maurice, 62 Royal Salisbury Way, Brampton, Ontario, Canada L6V 3J7, and Derek C. Tickner, 477 Dorland Road, Oakville, Ontario, Canada L6J 6B3

Filed Jun. 9, 1986, Ser. No. 871,685
Int. Cl.⁴ H02H *1/04*
U.S. Cl. 361—125 **8 Claims**



1. A protective device for use in association with a surge arrester having a ground lead terminal, the device being capable of limiting and interrupting fault current, comprising

an insulative housing,

a first terminal mounted at one end of the housing, said first terminal providing means for connection to the ground lead terminal of a surge arrester,

a second terminal mounted at the other end of the housing, said second terminal having a separable portion providing means for connection to a ground lead,

a current-limiting fuse connected in circuit between said first and second terminals,

a bypass switch shunting the current-limiting fuse,

a fault-sensing device in series with the bypass switch and said first terminal,

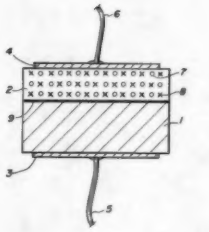
triggering means responsive to the fault-sensing device for opening the bypass switch, thereby to direct switch current to the fuse,

the bypass switch having a movable element which, when operated by the triggering means, is constrained to strike said separable portion of the second terminal, thereby separating said portion and so isolating the surge arrester from ground.

4,710,848
SOLID STATE CELL

Gerhard-Ludwig Schlechtriemen, Lübeck; Gerhard Hötzel, and Werner Weppner, both of Stuttgart, all of Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Fed. Rep. of Germany

Filed Aug. 21, 1986, Ser. No. 898,904
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1985, 3529335
Int. Cl.⁴ H01G *7/00;* **G01N** *7/10, 31/00*
U.S. Cl. 361—280 **7 Claims**

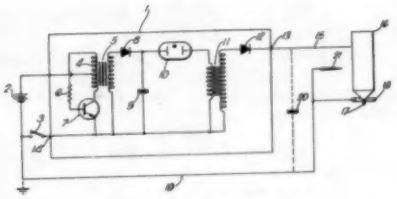


1. A solid state cell for measuring the activity of a component of a mixture, especially for the determination of the partial pressure of a component of a gas mixture, comprising a solid state ion conductor, a reference phase in contact with one side of said ion conductor, in contact with the other side of said conductor, a phase sensitive for the gas component to be determined and with said gas sensitive phase lead electrodes provided at the reference phase and at the gas sensitive phase, respectively, and wherein said gas sensitive phase contains an addition of a substance that increases the electronic conductivity and does not chemically react with the components of said sensitive phase and the gas to be detected.

4,710,849
HIGH VOLTAGE CONTROL

Alan J. Norris, Cleveland, England, assignor to Imperial Chemical Industries Plc, London, England

Filed Jul. 8, 1985, Ser. No. 752,623
Int. Cl.⁴ B05B *5/02*
U.S. Cl. 361—228 **15 Claims**



1. Apparatus comprising:

a high impedance generator capable of producing an on-load voltage in an excess of 3 kV;

spray dispenser means having a nozzle and coupled to said generator, for dispensing spray;

field adjustment electrode means coupled to ground and spaced from said nozzle to cause electrostatic charging of said spray leaving said nozzle; and

a first member having a low radius of curvature spaced from said dispenser by a gas gap, said member being coupled to the generator output, said member being spaced from said dispenser by such a spacing that when the voltage between said member and said dispenser exceeds a threshold value, corona discharge across said gap can occur to prevent corona discharge between said nozzle and said field adjustment electrode means.

4,710,850

TOWER DESIGN FOR HIGH-VOLTAGE SYSTEMS

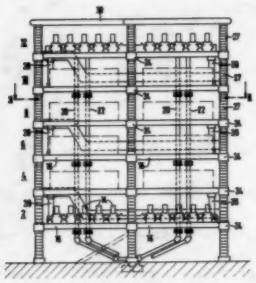
Herbert Jahn, Erlangen, and Günter Waedt, Forchheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 16, 1987, Ser. No. 3,933

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1986, 3605337

Int. Cl.[4] H02B *5/00*

U.S. Cl. 361—333 **8 Claims**



1. A tower for high-voltage systems comprising:

several stories which are connected to each other by means of insulators, each story consisting of support bars (16) of electrically insulating material, metallic cross bars (26) and cup-shaped node elements (24), wherein said bars (16) and said metallic cross bars (26) are interconnected by node elements (24) to enclose a rectangular area;

a supporting rib structure (32) of insulating transverse and longitudinal supports (34, 36) arranged in said areas;

said node elements including a cylindrical support body (42) with an axially arranged cylindrical core (44), a cylindrical surface (46), and end faces (48); and

two fastening posts (38) arranged at right angles to each other and right angles to said end faces (48) of the support body (42), said cylindrical core (44) being connected at said end faces (48) to axially arranged studs (58, 60).

4,710,851

COOLING ACCESSORY ATTACHABLE TO AN ELECTRONIC INSTRUMENT

Andrew S. Pastecki, 1780 Del Mar Ave., San Marino, Calif. 91108

Filed Mar. 10, 1986, Ser. No. 842,425

Int. Cl.[4] H02B *1/00;* **H02K** *7/20*

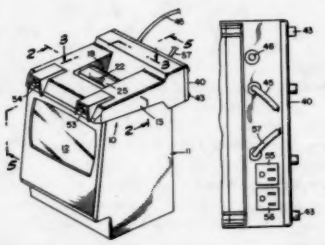
U.S. Cl. 361—384 **17 Claims**

1. A cooling accessory adapted to be clipped to encased electronic equipment to facilitate cooling of components of said electronic equipment, said accessory comprising:

a housing enclosing power-driven fan means between air inlet and outlet openings of said housing;

said housing being shaped for mounting against the exterior of encased electronic equipment with said air inlet in communication with an air outlet of said electronic equipment; and

clip means constructed and arranged for assembly astride continuous portions of said housing and said encased



electronic equipment to hold said cooling accessory firmly in place against the exterior surface of said encased electronic equipment;

wherein said housing has a depression in the wall thereof shaped and adapted for assembly in juxtaposition to a handle of said encased electronic equipment; and wherein said clip means is constructed for assembly astride said handle and juxtaposed portions of said cooling accessory housing.

4,710,852

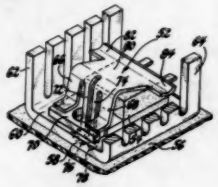
SPRING RETAINER FOR ENCAPSULATED SEMICONDUCTOR DEVICE

Nickey D. Keen, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 26, 1986, Ser. No. 911,736

Int. Cl.[4] H05K *7/20*

U.S. Cl. 361—386 **9 Claims**



1. An easily installed, pressure distributing retainer for clamping a device having an aperture therein to a plate-like member having an aperture therein, said retainer comprising:

a body of flat spring stock bent approximately centrally along a transverse fold line to define integral first and second noncoplanar portions having an acute angle therebetween;

first and second bayonet arms formed out of said first noncoplanar portion and extending substantially coplanarly within the acute angle between said noncoplanar portions;

each of said bayonet arms terminating in a transversely operative barb portion;

said bayonet arms being mutually transversely compliant to permit said bayonet arms to be flexed transversely as they are urged through an aperture;

at least one clamping arm formed out of said first noncoplanar portion,

said clamping arm being shorter than said bayonet arms and

having an end adapted for applying a clamping force towards a surface,

effective to allow said second noncoplanar portion to also apply a clamping force towards said surface.

4,710,853

ASSEMBLY FOR MOUNTED COMPONENTS WITH SNAP-ACTION

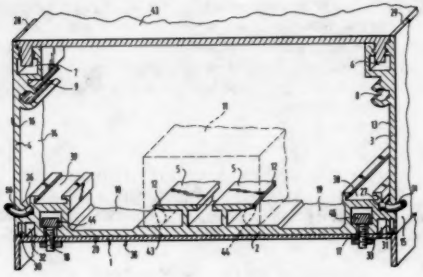
Rudolf Reinhardt, Markt-Schwabener-Strasse 2, D-8059 Finsing, Fed. Rep. of Germany

Filed Aug. 13, 1985, Ser. No. 765,336

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1984, 3429894

Int. Cl.[4] H05K *7/14*

U.S. Cl. 361—391 **12 Claims**



1. A structural assembly for interchangeably and supportably mounting electrical components of the type having snap-action mounts, comprising:

(a) one housing having a generally planar base wall extending along a longitudinal direction, a pair of upright longitudinally-extending side walls extending generally perpendicular to the base wall, a pair of upright end walls extending generally perpendicular to the base wall and generally perpendicular to the side walls, said walls bounding an interior space, and said one housing having an open top in communication with the interior space and through which electrical components are insertable in an insertion direction generally perpendicular to the base wall;

(b) a pair of longitudinally-extending slide rails spaced transversely apart from each other on the base wall within the interior space, said slide rails having respective snap-fastening elements situated above, and extending generally parallel to, the base wall, said snap-fastening elements being operative for releasably and interchangeably engaging snap-action mounts of electrical components;

(c) another housing arranged in mirror-symmetrical relationship with said one housing, said other housing having a bottom wall facing the base wall of said one housing at a distance, said base wall and said bottom wall having outer wall portions bounding outwardly-open longitudinally-extending grooves; and

(d) connecting plates mounted in opposing pairs of grooves on the housings and spanning said distance therebetween.

4,710,854

HYBRID MULTILAYER WIRING BOARD

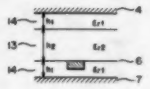
Minoru Yamada, Iruma; Motoyo Wajima, Hitachi; Akira Masaki, Musashino; Akio Takahashi, Hitachiota; Keiichirou Nakanishi, Kokubunji, and Katuo Sugawara, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

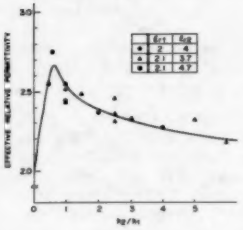
Continuation-in-part of Ser. No. 844,115, Mar. 26, 1986, abandoned. This application Mar. 10, 1987, Ser. No. 24,894

Claims priority, application Japan, Mar. 27, 1985, 60-60682

Int. Cl.[4] H05K *01/14*

U.S. Cl. 361—414 **13 Claims**





1. A multilayer wiring board comprising a plurality of conductor layers formed one over another each serving as either one of a power/ground line layer and a signal line layer, and a plurality of insulation layers each interposed between two adjacent ones of said conductor layers, wherein each of said insulation layers which are respectively interposed between two adjacent ones of said conductor layers serving as two power/ground layers with at least one conductor layer serving as a signal line layer also interposed between the two adjacent power/ground line layers is constituted by first and second insulating layer members formed one on the other, said second insulating layer member having a relative permittivity higher than that of said first insulating layer member, said first insulating layer member is disposed in a portion between the adjacent conductor layers serving as power/ground line layers where the density of electric flux created by a signal propagating in said signal line layer is relatively high and said second insulating layer member is disposed in a portion between the adjacent conductor layers serving as power/ground line layers where the density of electric flux created by a signal propagating in said signal line layer is relatively low, and the ratio of the thickness of said second insulating layer member with respect to that of said second insulating layer member is not smaller than about 1.4.

4,710,855

HEADLIGHT FOR MOTOR VEHICLES

Ulrich Urbschat, Hamm, Fed. Rep. of Germany, assignor to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany

Filed Nov. 4, 1986, Ser. No. 927,238

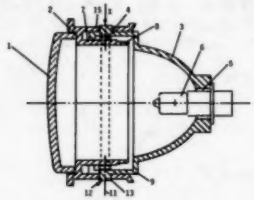
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542784

Int. Cl.[4] B60Q *1/06*

U.S. Cl. 362—66 **12 Claims**

1. A headlight for motor vehicles comprising: a reflector, an annular mount, and adjustment means as well as two bearings connecting said reflector to said annular mount; said bearings having an axis, said reflector being pivotable about said axis by said adjustment means, said axis being horizontal when the headlight is mounted in place; a light lens held at a continuous edge of said mount facing in direction of emerging light; said

mount having a cylindrical wall defining a cylindrical edge facing said reflector, said reflector having a cylindrical wall defining a cylindrical edge facing the cylindrical edge of said mount, one of said walls sized and partially disposed within the other of said wall in contactless overlap; a sealing ring clamped



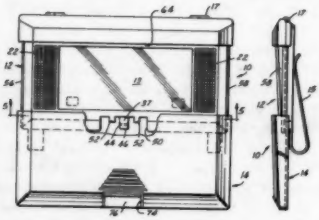
between surfaces of said cylindrical overlapping walls; said sealing ring defining a plane, said pivoting axis of said reflector being in said plane; said clamping surfaces being free of projections and depressions; said sealing ring having a circular cross-section when untensioned; each of said bearings comprising a tab formed onto said mount and rotatable on said reflector.

4,710,856

VANITY MIRROR ASSEMBLY

Kee K. Cheung, Kowloon, Hong Kong, assignor to Chi Kuan Manufactory Limited, Hong Kong, Hong Kong

Filed Jul. 7, 1986, Ser. No. 882,706
Int. Cl.[4] B60Q *1/00*; G02B *17/00*
U.S. Cl. 362—74 **9 Claims**



1. A vanity mirror assembly adapted to be mounted on an automobile visor or the like, comprising a mirror, a mirror support having a front surface on which said mirror is mounted, a cover for said mirror, and means mounting said cover on said mirror support for sliding movement along a path generally parallel to the plane of said mirror from a closed position overlying and concealing said mirror to an open position exposing said mirror for use, said means mounting said cover on said mirror support comprising tracks on opposite sides of said cover slidably engaged with tracks on opposite sides of said mirror support, said cover being made of a material which is sufficiently flexible to permit its tracks to be manually disengaged from the tracks of said mirror support so that said cover can be detached from said mirror support

---

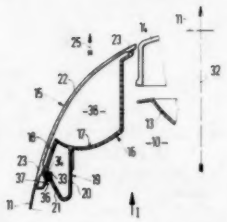
4,710,857

HEADLIGHT-BLINKING LIGHT UNIT FOR PASSENGER CARS

Kurt Haug, Reutlingen, and Rudolf Peterssen, Kusterdingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 28, 1986, Ser. No. 856,785
Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516711
Int. Cl.[4] B60Q *1/26*
U.S. Cl. 362—80 **9 Claims**

1. A headlight-blinking light unit for passenger vehicles having a vehicle body, with a trough, the unit comprising a headlight; a blinking light; a headlight housing arrangeable in a trough of the vehicle body and mountable in the same, said headlight housing having a shoulder and an edge; a blinking light housing displaceable on said headlight housing parallel to the longitudinal axis of the vehicle; means for mounting said blinking light housing in its operational position on said headlight housing, said blinking light housing being provided with at least one spring element which abuts against an inner side of the body and presses said blinking light against an outer side of



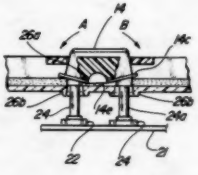
the body, said means for mounting said blinking light housing on said headlight housing including a horizontally acting spring arm which projects from said blinking light housing and cooperates with said shoulder of said headlight housing for providing a lateral arrangement of said blinking light housing and said headlight housing, and a vertically acting spring hook which projects from said blinking light housing and engages said edge of said headlight housing for providing an arrangement of said blinking light housing and said headlight housing in a travelling direction.

4,710,858

PANEL DISPLAYS, FRAMED LIGHTED SWITCH ACTUATORS THEREFOR

James E. Van Hout, 676 Briarvale Dr., Auburn Heights, Mich. 48057, and Frank H. Klein, 10020 Westleigh Dr., Huntsville, Ala. 35803

Filed Jan. 20, 1987, Ser. No. 4,449
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—95 **5 Claims**



1. An improved panel display for displaying lighted legends on rocker-type actuators used to actuate switches on a circuit board mounted below the panel display; wherein a backlighting system is employed to illuminate the legends on the actuators, the backlighting emanating from light sources on the circuit board; wherein the actuators rotate about a rotational axis within openings of an escutcheon plate of the panel display; wherein the underside and legend material of the actuators are transparent and translucent, respectively; and wherein a light pipe member is used to hold the actuators within the escutcheon plate, the light pipe member being of transparent material; the improvement comprising:

(a) means attached to the peripheral edge of the actuators for opposing seepage of backlighting through the apertures of the escutcheon plate and around edges of the actuators; and

(b) means for rotating the actuators about the axis within the

openings of the escutcheon while the light seepage opposing means is attached to the peripheral edge of the actuators.

4,710,859

D.C. TO D.C. CONVERTER WITH A SWITCH-MODE POWER SUPPLY

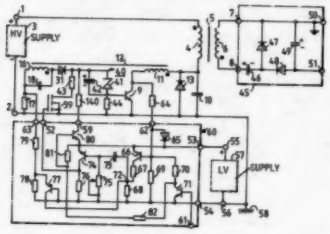
Gerard Rilly, Unterkirnach, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Jun. 3, 1986, Ser. No. 870,112

Claims priority, application European Pat. Off., Jun. 24, 1985, 85107828.7

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—21 **18 Claims**



1. D.C. to D.C. converter with a switch-mode power supply including a switching transistor (9) having its collector-to-emitter path connected in series with the respective primary windings (11,4) of a current (12) and a power transformer (5), across the terminals (1,2) of a first D.C. power supply (3), a commutating capacitor (10) connected between the emitter of said transistor (9) and the junction of said primary windings (4,11), a base-drive circuit including the secondary winding (16) of said current transformer (12) and coupled to the base of said transistor (9) and a tuning capacitor (18) shunting said current transformer secondary winding (16) for forming with the inductance thereof a parallel resonant or oscillating circuit, characterized in that said secondary winding and said tuning capacitor have impedances selected for causing the resonant half-period of said parallel resonant or oscillating circuit (16, 18) to be shorter than that of the power transformer (5) primary winding (4) inductance with the capacitance of the commutating capacitor (10).

4,710,860

RIPPLE-FREE DC HIGH VOLTAGE GENERATING APPARATUS FOR X-RAY TUBE

Akira Tsuchiya, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 21, 1985, Ser. No. 800,319

Claims priority, application Japan, Nov. 26, 1984, 59-250350; Dec. 7, 1984, 59-257404

Int. Cl.[4] H02M *3/315*

U.S. Cl. 363—28 **7 Claims**

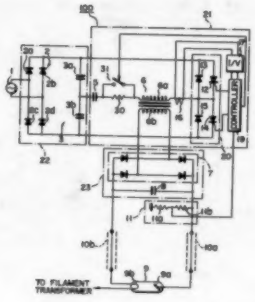
1. A DC high voltage generating apparatus for an X-ray tube comprising:

primary rectifier means for rectifying a low AC voltage to derive a low DC voltage;

bridge inverter means including a single phase transformer having primary and secondary windings, a capacitive element series-connected via a current limiter to the primary winding so as to constitute a series resonant circuit, a bridge inverter circuit having switchable elements for inverting the low DC voltage into a pulsating low voltage, and a switching controller for controlling the switch-on times of the switchable elements;

secondary rectifier means for rectifying a high AC voltage induced at the secondary winding of the transformer by the pulsating low voltage into a high DC voltage for the X-ray tube; and

switching means connected in parallel to the current limiter



of the bridge inverter means, for changing the value of the pulsating low voltage induced at the primary winding by short-circuiting the current limiter so as to vary the high DC voltage derived from the secondary rectifier means.

4,710,861

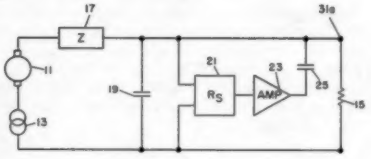
ANTI-RIPPLE CIRCUIT

Martin Kanner, 42 Glenwood Rd., Plainview, N.Y. 11803

Filed Jun. 3, 1986, Ser. No. 870,176

Int. Cl.[4] H02M *1/14*

U.S. Cl. 363—46 **4 Claims**



1. An apparatus for reducing ripple signals on a d.c. signal coupled across first and second terminals comprising:

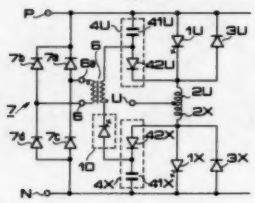
a differential voltage amplifier, having a gain, an inverting voltage input terminal coupled to said first terminal, a non-inverting voltage input terminal coupled to said second terminal, and a voltage output terminal responsive to voltage differences between voltages coupled to said inverting voltage input terminal and said non-inverting voltage input terminal; and

a capacitor having a capacitance value, a first plate directly connected to said output terminal and a second plate directly connected to said first terminal, said capacitor and said differential voltage amplifier constructed and arranged to multiply said capacitance value by a factor determined by said gain such that a shunt capacitance value is developed across said first and second terminals that is equal to said capacitance value multiplied by said factor whereby said ripple signal is reduced in accordance with said shunt capacitance value.

4,710,862
INVERTER

Takeaki Asaeda, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 8, 1985, Ser. No. 720,962
Claims priority, application Japan, Jul. 27, 1984, 59-158320
Int. Cl.[4] H02H 7/122
U.S. Cl. 363—58 5 Claims



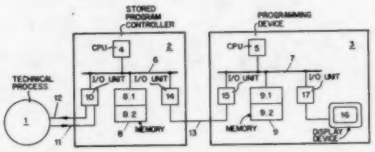
1. An inverter comprising:
at least a pair of arm elements, each comprising a self turn-off switching device forming positive and negative parts;
a pair of reactors connected in series between said positive and negative arm elements;
first and second snubbers, each including a serial connection of a snubber capacitor and a snubber diode, connected in parallel to said positive and negative arm elements, respectively;
a current transformer having primary and secondary windings for retrieving electrical energy stored in said snubbers;
a third closed circuit including the primary winding of said current transformer and a self turn-off switching device connected in series to said primary winding, with one end of said circuit being connected to the node of said diode and capacitor in said first snubber, and with another end of said circuit being connected to the node of said diode and capacitor in said second snubber;
a rectifying circuit for transferring electrical energy retrieved on the secondary winding of said current transformer back to a d.c. power source; and
a gate circuit which produces gate signals for turning on or off said switching devices forming said arm elements, and a gate signal for turning on and keeping on said switching device in said closed circuit for a period long enough to transfer energy stored in said snubbers back to said d.c. power source through said current transformer and said rectifying circuit, and thereafter turning off said switching device, in correspondence to the on-off operation of said arm switching devices.

4,710,863
PROGRAMMING DEVICE FOR A STORED-PROGRAM CONTROLLER

Felix Kaufmann, Mülligen, and Daniel Schillinger, Fislisbach, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Apr. 22, 1986, Ser. No. 854,602
Claims priority, application Switzerland, Apr. 25, 1985, 1763/85
Int. Cl.[4] G06F 15/46
U.S. Cl. 364—146 2 Claims

1. Apparatus for programming a stored-program controller, in which a control program of the controller, containing function calls and stored in a machine-readable form, is displayed in function-diagram representation on a graphical display device by an operating system of a digital computer, wherein said operating system of the digital computer:
(a) searches for the function calls in the control program;
(b) writes the function calls found sequentially with the lists of associated input and output parameters into a file;
(c) splits the file by allocating the function calls to part sequences of function calls, in which splitting operation, beginning with the last function call, each function call, the output parameter of which does not contribute anything to the formation of an input parameter of a function call already allocated to the respective part sequence, is allocated to a new part sequence;
(d) allocates values to a first set of variables which are allocated to the individual function calls, of the graphical representation of the function calls including edge zones on the display device;
(e) allocates values to a second set of variables which are also allocated to the individual function calls, in which operation these values establish the normalized horizontal displacement of the function calls on the display device and in each case correspond to the largest of the sums which, for the function call considered in each case, can be formed from the values of the variables of the first set which are allocated to the function calls depending on this function call with respect to parameters;



(f) allocates values to a third set of variables which are associated with the part sequences, in which operation the values establish the normalized vertical extension of the graphical representation of the part sequences on the display device and in each case correspond to twice the number of function calls in the respective part sequence plus the number of the input parameters not generated in the respective part sequence itself less the number of the first and last input parameters, generated in the respective part sequence itself, in the parameter lists of the individual function calls in the respective part sequence;
(g) allocates values to a fourth set of variables which, in turn, are allocated to the part sequences, in which operation the values establish the normalized vertical displacement of the part sequences on the display device and in each case result from the sum of the values of the variables of the third set which are allocated to the part sequences in the sequence of part sequences.

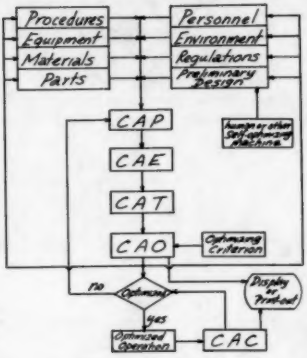
4,710,864
SELF-OPTIMIZING METHOD AND MACHINE

Chou H. Li, 379 Elm Dr., Roslyn, N.Y. 11576

Filed Sep. 19, 1984, Ser. No. 652,494
Int. Cl.[4] G05B 13/02
U.S. Cl. 364—148 20 Claims

1. A machine for real-time self-optimizing, without human interaction, an object relative to a specific criterion or activity in response to variations on a prescribed number m of variabes, comprising:
means for automatically planning a statistical design matrix for testing the m variables in n tests;
means for performing said n designed tests according to the design matrix on said object;
means for determining the instantaneous combination of said m variables which optimizes said specific criterion or activity;

means for setting the conditions of said m variables at the thus-determined optimal combination: and



means for coupling the planning, performing, determining, and setting means for substantially continuous recycling to achieve real-time self-optimizing control.

4,710,865

CONTROL SYSTEM FOR POSITIONING AN OBJECT USING SWITCHING FROM A SPEED CONTROL MODE TO A POSITION CONTROL MODE WITH ADJUSTABLE BRAIN

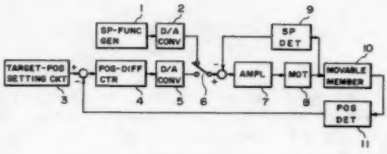
Makoto Higomura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

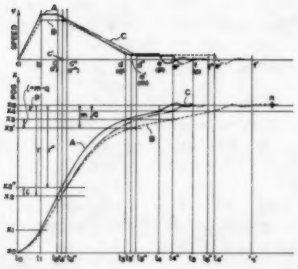
Filed Nov. 12, 1985, Ser. No. 797,030

Claims priority, application Japan, Nov. 14, 1984, 59-238665; Nov. 16, 1984, 59-240419; Nov. 16, 1984, 59-240420

Int. Cl.[4] G05B *11/00*

U.S. Cl. 364—170 **9 Claims**





1. A control system for positioning a movable member, said system comprising:

first control means operative to move the movable member at a first moving speed toward a target stop position, said first control means also being operative to decrease said first moving speed of the movable member to a second moving speed when the movable member moves from a predetermined deceleration starting position toward said target stop position;

second control means operative on the movable member, after said second moving speed is established, to place the movable member at said target stop position with a relatively high positional accuracy;

means for detecting a positional error of the movable member with respect to a reference at a time when said second moving speed is established; and

means for changing said deceleration starting position on the basis of detection by said detecting means.

4,710,866

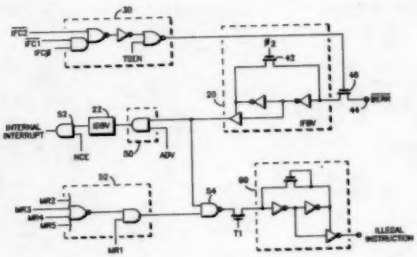
METHOD AND APPARATUS FOR VALIDATING PREFETCHED INSTRUCTION

John Zolnowsky; Lester M. Crudele, both of Austin, and Michael E. Spak, Kyle, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 530,820, Sep. 12, 1983, abandoned. This application Oct. 7, 1986, Ser. No. 930,941

Int. Cl.[4] G06F *11/00, 9/38*

U.S. Cl. 364—200 **2 Claims**



1. In a data processor which executes predetermined sequences of instructions comprising programs stored in a memory, each instruction consisting of at least m instruction units, but on more than n instruction units where m is an integer greater than zero (0) and n is an integer greater than or equal to m, the data processor comprising:

an n-stage instruction pipeline for storing in each stage one instruction unit;

instruction execution means, coupled to the instruction pipeline and responsive to the one of said instructions stored in the instruction pipeline beginning at an output end thereof and ending at an m-th stage thereof, the instruction execution means executing said one of said instructions and providing an instruction prefetch signal during the execution thereof;

instruction prefetch means, coupled to the instruction execution means and responsive to the instruction prefetch signal, for fetching each instruction unit of the next instruction in said predetermined sequence of instructions from said memory; and

instruction pipeline control means, coupled to the instruction prefetch means and to the instruction pipeline, for storing each instruction unit fethed by the instruction prefetch means into an input stage of the instruction pipeline after advancing the instruction unit stored in each stage of the instruction pipeline into the next higher stage thereof, until the first instruction unit of the instruction to be next executed by the instruction execution means in stored in the output stage of the instruction pipeline;

a prefetch validation circuit comprising:

n serially-connected validation latches, each corresponding to a respective stage of the instruction pipeline and serially advancing in synchronism therewith, for storing a valida-

tion bit indicative of the invalidity of the instruction unit stored in the corresponding stage of the instruction pipeline;

prefetch error detecting means, coupled to the instruction prefetch means and to the validation latch corresponding to the input stage of the instruction pipeline, for detecting errors occurring during the fetch of each instruction unit which indicate the invalidity of that instruction unit, and storing the valadition bit as an indication of said detected error in the validation latch corresponding to the input stage of the instruction pipeline into which said invalid instruction unit is stored; and

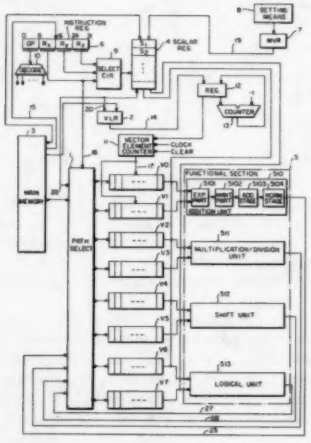
instruction validation means, coupled to the instruction pipeline and the validation latches, for generating an invalid instruction signal if the validation bit stored in the validation latch corresponding to any of the m instruction units stored in the m highest stages of the instruction pipeline, comprising the next instruction to be executed by the instruction execution means, indicates that the instruction unit stored in the corresponding stage of the instruction pipeline is invalid.

4,710,867

VECTOR PROCESSING SYSTEM

Tadashi Watanabe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 11, 1985, Ser. No. 753,943
Claims priority, application Japan, Jul. 11, 1984, 59-143578
Int. Cl.[4] G06F *7/48*
U.S. Cl. 364—200 **4 Claims**



1. A vector processing system comprising:

a main memory for storing instructions and operands including vector elements;

at least one scalar register;

a plurality of vector registers each having a plurality of storage locations for storing said vector elements;

functional means responsive to a first instruction for performing a predetermined operation for said vector elements supplied from at least one of said vector registers;

first storage means for holding register length information indicative of the number of storage locations to be used in each of said vector registers;

setting means for setting said register length information in said first storage means before a vector processing operation;

control means responsive to a second instruction for transferring said register length information from said first storage means to said at least one scalar register and said main memory during said vector processing operation;

second storage means for holding the number of said vector elements to be stored in said at least one vector register based upon one of (1) said register length information stored in said at least one scalar register and said main memory or (2) the remainder obtained by dividing a number (N) of vector operations specified by a third instruction by said register length information; and

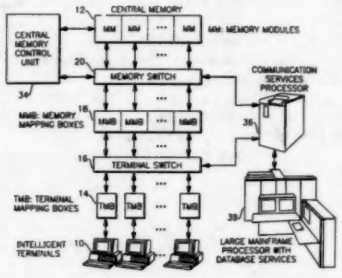
read-out means for sequentially reading out said vector elements in said at least one vector register into said functional means in response to the content of said second storage means.

4,710,868

INTERCONNECT SCHEME FOR SHARED MEMORY LOCAL NETWORKS

John Cocke, Bedford, and Brent T. Hailpern, Katonah, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 29, 1984, Ser. No. 626,260
Int. Cl.[4] G06F *3/00*
U.S. Cl. 364—200 **7 Claims**



1. A data processing system of the type including a plurality of intelligent terminals, a shared memory, and interconnect means for providing access to said shared memory by said intelligent terminals, said interconnect means comprising:

a plurality of first mapping boxes for receiving first addresses from said intelligent terminals, said first addresses including a virtual address and offset, and for converting said virtual addresses to respective terminal switch port designations and logical addresses;

a first switch having a plurality of first switch ports coupled to said first mapping boxes and having a plurality of second switch ports, said first switch for forwarding said logical addresses and offsets as second addresses to respective second switch ports corresponding to said terminal switch port designations;

a plurality of second mapping boxes for receiving said second addresses and converting said second addresses to respective memory switch port designations and physical addresses; and

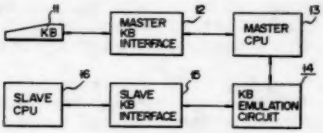
a second switch having a plurality of first switch ports for receiving said memory switch port designations and physical addresses and having a plurality of second switch ports connected to address inputs of said shared memory, said second switch for forwarding said physical addresses and offsets to respective second ports of said second switch corresponding to said memory switch port designations.

4,710,869

KEY INPUT DATA EMULATION SYSTEM

Takatoshi Enokizono, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 26, 1985, Ser. No. 705,729
Claims priority, application Japan, Feb. 29, 1984, 59-37516
Int. Cl.⁴ G06F *7/00*
U.S. Cl. 364—200 **7 Claims**



1. A key input data emulation system comprising:

a single keyboard unit having key switches arranged in an X-Y matrix for generating, when depressed, an X key input code and a Y key input code corresponding to the depressed key switch;

master processing means responsive to said X and Y key input codes for selectively transmitting said X and Y key input codes;

slave processing means for reading data corresponding to said X and Y key input codes in response to an interrupt signal;

a keyboard emulation circuit responsive to said X and Y key input codes from said master processing means, including:

register means for holding said X and Y key input codes from said master processing means,

comparator means for comparing the X key input code from said register means and a keyboard scan signal and for outputting a comparison coincidence signal when said X key input code and said keyboard scan signal are coincident, and

a decoder for decoding the Y key input code from said register means using the comparison coincidence signal as an enable signal, said decoder outputting a decoded signal as a return signal; and

slave keyboard interface means for: (1) outputting said keyboard scan signal to said comparator means to read the corresponding X and Y key input codes, (2) determining in response to said return signal from said decoder whether said X and Y key input codes are being presented by said master processing means to said keyboard emulation circuit, and (3) supplying said interrupt signal and said data corresponding to said X and Y input codes to said slave processing means if said X and Y key input codes are present.

4,710,870

CENTRAL COMPUTER BACKUP SYSTEM UTILIZING LOCALIZED DATA BASES

Catherine A. Blackwell, Franklin Township, Somerset County; Raman Lakshmanan, Edison Township, Middlesex County, and Mahadevan Subramanian, Fair Haven, all of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

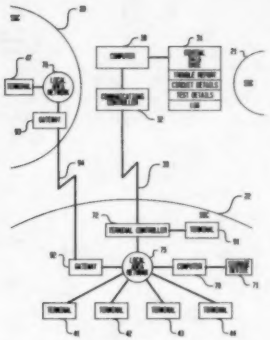
Filed Jul. 10, 1985, Ser. No. 753,619
Int. Cl.⁴ G06F *15/16*
U.S. Cl. 364—200 **12 Claims**

1. Information backup apparatus for a primary data base stored in a primary storage system comprising

a plurality of storage means each containing a secondary data base,

means, connected to said plurality of storage means, for accessing each said secondary data base, and

means, connected to said means for accessing and the primary storage system, for responding to input information provided by a direct user of the primary data base, for extracting data from the primary data base in response to said user input, for processing and storing data related to said extracted data in predetermined groups in the primary storage system, and for periodically distributing said predetermined groups of data to predetermined ones of



said storage means to update each said secondary data base with corresponding data from said predetermined groups.

4,710,871

DATA TRANSMITTING AND RECEIVING APPARATUS

William M. Belknap; Albert J. Chanasyk; Robert R. O'Dell, and Donald J. Girard, all of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 1, 1982, Ser. No. 438,105
Int. Cl.⁴ G06F *13/00*
U.S. Cl. 364—200 **8 Claims**

1. In a data processing system wherein a plurality of processing devices share a common communication channel by way of which transfer of data messages between a sending processing device and a receiving processing device takes place, an integratd circuit chip associated with each processing device for generating a data message comprising the acknowledgement of the receipt and the received condition of a data message transmitted between the sending processing device and the receiving device, said chip comprising:

means for generating a plurality of first control signals identifying the condition of the data message received from a sending processing device;

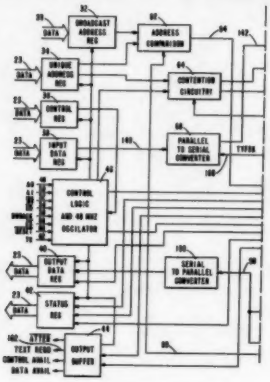
first logic circuit means connected to said generating means for outputting a second control signal in response to receiving said first control signals;

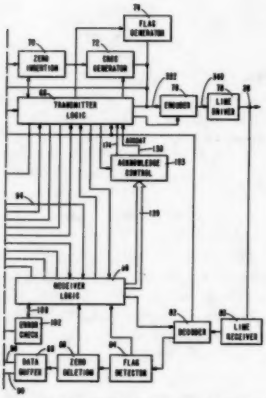
a shift register means connected to said generating means and said first logic circuit means for outputting a portion of an acknowledgement message comprising a sequence of two pairs of binary data bits which includes a pair of first binary data bits identifying the condition of the data message receiver from the sensing processing device and a pair of second binary data bits preceding the least significant bit of each of said first binary data bits for use in framing and decoding said first binary data bits in response to receiving said first and second control signals;

transmitting means connected to said communication channel and to said shift register means for repeatedly transmitting said pairs of said first and second binary data bits over said communication channel to the sending processing device a predetermined number of times comprising the acknowledgement message acknowledging the receipt of said data message from the sending device in which each pair of first binary data bits are framed by two pairs of said second binary data bits; and

timing means connected to said transmitting means for dis-

abling said transmitting means after said transmitting means has repeatedly transmitted the sequence of pairs of





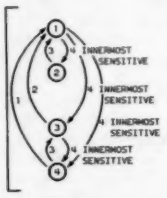
said first and second binary data bits said predetermined number of times over said communication channel.

4,710,872

METHOD FOR VECTORIZING AND EXECUTING ON AN SIMD MACHINE OUTER LOOPS IN THE PRESENCE OF RECURRENT INNER LOOPS

Randolph G. Scarborough, Palo Alto, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 7, 1985, Ser. No. 763,481
Int. Cl.[4] G06F *9/30*
U.S. Cl. 364—300 **8 Claims**



1. A method for execution on an SISD machine for ascertaining any source code procedural language statements which are amenable to being compiled into object code for execution on an SIMD machine, comprising the steps of:

(a) mapping in said SISD machine said source code statements onto n counterpart nodes of a dependence graph, said graph (FIGS. 2A, 2B) having directed edges, the edges connecting nodes according to dependences and selectively forming closed traverses or loops, the edges further being selectively nested and labeled with a level number (FIGS. 2A, 3A, edges labeled 4) indicating the level of any node (1, 2, . . . , n) causing the dependence, each edge (FIG. 2B) being further labeled with indicia as to whether it is either innermost-sensitive or innermost-preventing;

(b) identifying in said SISD machine the statements at the nodes bounding each level of any innermost-sensitive and loop-independent edges of the graph, if at that level, the edges having the labeled dependences can be reordered to operate as an innermost loop and if there are no cycles in the graph after recording; and

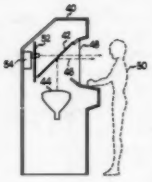
(c) generating in said SISD machine object code obtained from any statements identified in step (b).

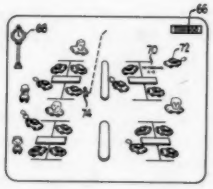
4,710,873

VIDEO GAME INCORPORATING DIGITIZED IMAGES OF BEING INTO GAME GRAPHICS

Jeffrey D. Breslow, Highland Park; Howard J. Morrison, Deerfield; Steven P. Hanson, Winnetka, and Russell G. Rasmussen, Skokie, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Continuation-in-part of Ser. No. 395,353, Jul. 6, 1982, abandoned. This application Mar. 9, 1984, Ser. No. 587,990
Int. Cl.[4] A63F *9/22*; G06F *15/44*
U.S. Cl. 364—410 **18 Claims**





1. A video game system comprising:

user input apparatus for providing signal outputs responsive to user provided stimulus;

control means for providing a video game audiovisual presentation, said presentation comprising a sequence of display images, said display images each comprising the combination of a plurality of predetermined imagery segments including a preselected character imagery segment, said sequence order of presentation determined responsive to a non-user defined predefined set of game rules and responsive to the user input apparatus;

means for creating a user video image responsive to the user input apparatus including means for storing said user video image in a memory; and

means for associating said user video image with said prese-

lected character imagery segment such that said user video image is incorporated into said audiovisual presentation of said video game.

7. Video game apparatus comprising:

means, including video imaging means, for acquiring a video image of at least a portion of a being and generating video signals representing said acquired video image;

means responsive to said video signals for encoding said video signals into digital data;

means for storing said digital data;

a video game including a display;

player actuable video game control means for controlling the video game image displayed on said game display; and

display generating means controlled by said video game control means for generating video game display signals to said video game display and for selectively incorporating said stored digital data for display of a display video image representing said acquired video image on said video game display.

4,710,874

METHOD AND APPARATUS FOR DISPLAYING PARTICLE SEDIMENTATION RATES IN LIQUIDS

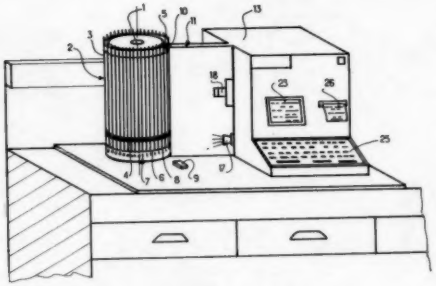
Paul-Henri Cinqualbre, 20, rue de la Ravinelle, 54000 Nancy, France

Filed Jun. 11, 1985, Ser. No. 743,596

Claims priority, application France, Jun. 13, 1984, 8409360

Int. Cl.[4] G01N *33/48, 21/51;* **G06F** *15/42*

U.S. Cl. 364—413 **14 Claims**



5. An apparatus for continuous display of a particle sedimentation rate in a liquid, comprising in combination

rotary support means adapted to hold a plurality of light-transparent containers, each container holding a liquid,

means for selecting any container to be observed, at least a portion of a selected container being observable from the exterior,

lighting means illuminating the selected container,

image-forming means arranged to form an image of said at least portion of the selected container, and the liquid held therein,

means on said image-forming means to create video signals from the so-formed image,

computer means arranged to process said video signals,

video signal transmission means transmitting said video signals from said image-forming means to said computer means, and

display means for displaying the signals processed by said computer means.

4,710,875

ALIGNMENT PROCEDURE FOR RADIATION IMAGES UNDERGOING SUBTRACTION PROCESSING

Nobuyoshi Nakajima, and Kazuhiro Hishinuma, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

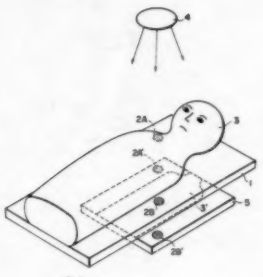
Filed Mar. 21, 1983, Ser. No. 477,571

Claims priority, application Japan, Mar. 20, 1982, 57-45473

The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.

Int. Cl.[4] H04N *5/32*

U.S. Cl. 364—414 **6 Claims**



1. A subtraction processing method for radiation images including the steps of recording two or more radiation images on separate stimulable phosphor sheets, at least a part of image information being different among said radiation images, scanning the respective stimulable phosphor sheets with stimulating rays to sequentially release the radiation energy stored in the stimulable phosphor sheets as light emission, photoelectrically detecting the emitted light by a light detecting means to obtain digital image signal corresponding to the respective radiation images, and extracting an image of a specific portion of said radiation images by conducting a subtraction processing among said digital image signal,

the subtraction processing method for radiation images comprising:

(i) when each radiation image to be subtraction processed is recorded on each stimulable phosphor sheet, simultaneously recording a marker having such a shape as provides a reference point or a reference line to said stimulable phosphor sheet in a position fixed with respect to said radiation image,

(ii) scanning said stimulable phosphor sheet carrying said radiation image stored therein with stimulating rays, and detecting the position coordinate of said reference point or said reference line provided by said marker from the digital image signal of said image detected from the light emitted from said stimulable phosphor sheet,

(iii) conducting the steps i) and ii) for said two or more radiation images to be subtraction processed,

(iv) calculating a rotation and a shift among said two or more radiation images based on the respective reference points or reference lines corresponding to said two or more radiation images to be subtraction processed,

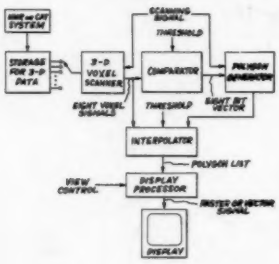
(v) when said rotation exists, rotating digitally either one of said radiation images to be subtraction processed, and/or when said shift exists, moving digitally either one of said radiation images to be subtraction processed, and

conducting a subtraction processing of the image signal value among the corresponding picture elements of said two or more radiation images to be subtraction processed.

4,710,876
SYSTEM AND METHOD FOR THE DISPLAY OF SURFACE STRUCTURES CONTAINED WITHIN THE INTERIOR REGION OF A SOLID BODY

Harvey E. Cline, Schenectady, and William E. Lorensen, Ballston Lake, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 5, 1985, Ser. No. 741,390
Int. Cl.[4] G06F *15/42*
U.S. Cl. 364—414 **16 Claims**



1. A system for displaying three dimensional surface structures comprising:

means for storing three dimensional signal patterns representing the value of at least one physical property associated with a three dimensional body at regularly spaced grid locations within said body;

means for retrieving the eight three dimensional signal pattern values associated with each set of cubically adjacent grid locations within said body;

means for comparing each set of said eight values with a predetermined threshold value to generate an eight bit binary vector each of whose elements is zero or one, based on the result of said comparison;

means for generating a set of coordinate values for each distinct binary vector, said coordinate values representing the vertices of at least one predetermined polygonal surface which approximates the intersection of surfaces determined by said threshold value with the volume defined by said eight grid points, said coordinate values also being dependent on the location of said eight grid locations within said body;

display processor means for receiving said coordinate values and for converting said coordinate values to a display format; and

means for displaying surfaces determined by said threshold, said display means being driven by said display processor.

4,710,877
DEVICE FOR THE PROGRAMMED TEACHING OF ARABIC LANGUAGE AND RECITATIONS

Moustafa E. Ahmed, Dept. of Electical Engineering Worcester Polytechnic Institute, Worcester, Mass. 01609

Filed Apr. 23, 1985, Ser. No. 726,060
Int. Cl.[4] G06F *15/20, 15/38*
U.S. Cl. 364—419 **22 Claims**

1. A teaching device for Arabic language and Qur'anic recitation which comprises:

(a) an optical display means;

(b) an interface means connected to said optical display means;

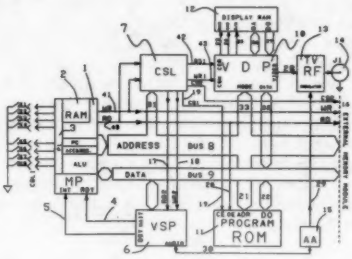
(c) a first storage media for storage of Arabic character patterns for use in generation of characters;

(d) a second storage media for coded Arabic allophones/syllables and words;

(e) a first storage means for coded words and coded sounds;

(f) a second storage means for teaching programs, the programs including limited-choice operation commands and options in a programmed hierarchy, adapted to lead a student through progressing levels in accord with the student's response to a series of partially randomized questions and prompts, utilizing interactive evaluation means;

(g) an input means whereby selection of said operation commands is achieved;



(h) a voice synthesis means and means for speech and sound production;

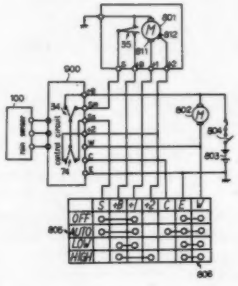
(i) a computer means for coupling the said optical display means to said input means, to said first and second storage media, to said first and second storage means, and to said voice synthesis means; and

(j) an external storage means for operating software having an interface with said computer means.

4,710,878
APPARATUS AND A METHOD FOR CONTROLLING WIPER

Motomi Iyoda, Toyota, Japan, assignor to Toyota Jidoshi Kabushiki Kaisha, Aichi, Japan

Filed Dec. 30, 1985, Ser. No. 814,801
Claims priority, application Japan, May 11, 1985, 60-54226[U]
Int. Cl.[4] H02P *1/04*
U.S. Cl. 364—424 **20 Claims**



1. An apparatus for controlling a wiper comprising:

a detecting means for detecting an amount of rain positioned thereon, said detecting means outputting a detected rain signal, the detected rain signal corresponding to the detected amount of rain positioned on said detecting means after the wiper wipes out water deposited on said detecting means;

a first comparator means for comparing the detected rain signal with a first predetermined signal, the first predetermined signal corresponding to a first predetermined amount of drops of water, said first comparator means determining if the detected amount of rain is equal to or greater than the first predetermined amount of drops of

water, wherein when said first comparator means determines the detected amount of rain is equal to or greater than the first predetermined amount of drops of water, said first comparator means outputs a first output signal;

an actuator means for actuating the wiper in accordance with receipt of the first output signal so that when said actuator means receives the first output signal, said actuator means produces an actuating output signal and actuates the wiper at a first wiping speed;

a second comparator means for comparing the detected rain signal with a second predetermined signal, the second predetermined signal corresponding to a second predetermined amount of drops of water, said second comparator means determining if the detected amount of rain is equal to or greater than the second predetermined amount of drops of water, wherein when said second comparator means determines the detected amount of rain is equal to or greater than the second predetermined amount of drops of water, said second comparator means produces a second output signal;

a timer means for receiving the actuating output signal outputted from the actuator means, and for producing a first clock signal when the wiper returns to an initial position, the first clock signal having a first time period, said timer means receiving a change output signal, and producing a second clock signal having a second time period;

a memory means for receiving said second output signal and the first and second clock signals and for memorizing said second output signal, said memory means reproducing said memorized second output signal during the first time period after the wiper wipes out the water deposited onsaid detecting means in accordance with receipt of the first clock signal, said memory means reproducing said memorized second output signal during the second time period after the wiper wipes out the water deposited on said detecting means in accordance with receipt of the second clock signal; and

a changing means for receiving the memorized second output signal and for producing the change output signal for changing the wiping speed of the wiper at a time when the wiper returns to the initial position thereof in accordance with receipt of the memorized second output signal reproduced from the memory means.

4,710,879

RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION

Hamid Vahabzadeh, Rochester Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 12, 1986, Ser. No. 828,677

Int. Cl.[4] B60K *41/12*; G06F *15/20*

U.S. Cl. 364—424.1 **3 Claims**

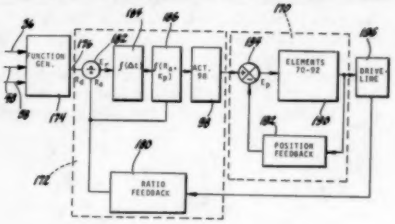
2. For a continuously variable ratio transmission having an inner servo loop which adjusts the transmission speed ratio in accordance with a ratio command R_{cmd}, and a mechanism for providing a periodically updated indication of the transmission desired speed ratio R_d, a method of operation for bringing the actual speed ratio R_a into correspondence with the desired speed ratio R_d, the method comprising the steps of:

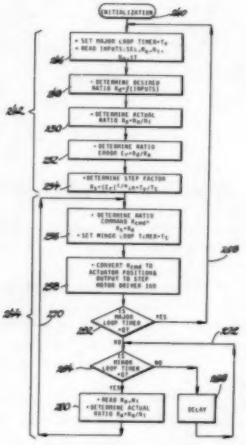
computing the speed ratio error E_r at each update of the desired speed ratio R_d substantially according to the expression: $E_r = R_d/R_a$; and

for each computation of the ratio error E_r, obtaining n successive samples of the actual speed ratio R_a, determining a ratio command R_{cmd} in relation to the product of the actual ratio R_a and a ratio step factor R_s for each sample of the actual speed ratio R_a, the step factor being determined substantially according to the expression $R_s = (E_r)^{1/n}$, and applying the ratio command R_{cmd} to the inner servo loop, thereby to provide a system time response characteristic wherein the time required to change the ratio by any given factor is substantially the same.

3. For a vehicle drive train having a continuously variable transmission and a control mechanism which adjusts the transmission speed ratio in accordance with a ratio command, control apparatus comprising:

means including a computer based control unit for (1) determining a desired transmission speed ratio in accordance with vehicle operating parameters, (2) determining the ratio error of the actual speed ratio relative to the desired speed ratio as an indication of the factor f by which it is desired to change the actual ratio, and (3) computing a ratio step factor in relation to the nth root of said ratio





error, where n is the number of corrective steps to be employed in effecting the desired ratio change, and thereafter generating n successive ratio commands for the control mechanism, each such ratio command being generated according to the product of the actual speed ratio and said ratio step factor, thereby bringing the actual speed ratio into correspondence with the desired speed ratio in a time interval that is substantially the same for any factor f of ratio change.

4,710,880

VEHICLE SPEED CONTROL APPARATUS AND METHOD

Pierre A. Zuber, Baldwin, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 28, 1984, Ser. No. 675,675

Int. Cl.[4] G06F *11/16*; B61L *3/20*

U.S. Cl. 364—426 **4 Claims**

1. In apparatus for controlling a vehicle having a propulsion and brake controller and moving along a track providing to the vehicle an input speed command, the combination of:

first means responsive to the vehicle movement for providing a first vehicle speed signal;

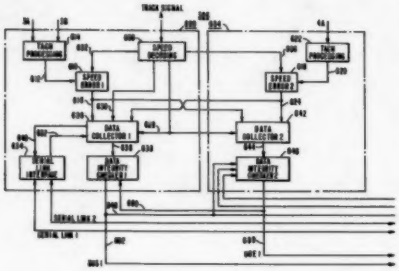
second means responsive to the vehicle movement for providing a second vehicle speed signal;

first speed channel control means having a first channel

responsive to the input speed command and responsive to the first vehicle speed signal to provide a first speed error and having a second channel responsive to the input speed command and the second vehicle speed signal to provide a second speed error;

at least second speed channel control means having a third channel responsive to the input speed command and responsive to the first vehicle speed signal to provide a third speed error and having a fourth channel responsive to the input speed command and responsive to the second vehicle speed signal to provide a fourth speed error;

said first speed channel control means including comparator means for comparing the first, second, third and fourth speed errors to provide a first output signal to enable the operation of the propulsion and brake controller when there is substantial equality among said speed errors;



said first speed channel control means further having means for making a first integrity check of said first and second speed channel control means and permitting the first output enable signal to operate the controller when the first integrity check is satisfactory;

said second speed channel control means including another comparator means for comparing the first, second, third and fourth speed errors to provide a second output signal to enable the operation of the propulsion and brake controller when there is substantial equality among said speed errors; and

said second speed channel control means further having means for making a second integrity check of said first and second speed channel control means and permitting the second output enable signal to operate the controller when the second integrity check is satisfactory.

4,710,881

KNOCK CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

Yasunori Mouri, and Noboru Sugiura, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 458,455, Jan. 17, 1983, abandoned. This application May 30, 1986, Ser. No. 868,441

Claims priority, application Japan, Jan. 18, 1982, 57-4997

Int. Cl.[4] F02P *5/14*

U.S. Cl. 364—431.08 **21 Claims**

1. A knock control apparatus for an internal combustion engine comprising:

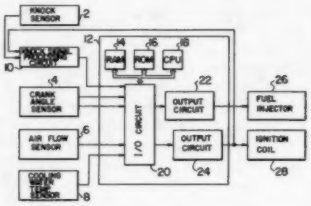
sensor means for generating signals indicative of operation conditions of an engine;

actuator means response to control signals from said sensor means to control energy conversion functions of said engine;

knock sensing means for sensing a presence or absence of knocking in said engine and generating a knock detection signal indicative of an occurrence of knocking;

control circuit means responsive to the signals from said sensor means to perform engine controlling data processing operations and thereby supply engine control values to said actuator means, said control circuit means including first means for detecting an acceleration of said engine on a basis of output signals from said sensor means, memory means for storing first data of an ignition timing retard angle in an accelerated state of the engine and second data of an ignition time retard angle which is less than said first data in engine operational states other than the acceleration state, and second means for selectively reading out from said memory means one of said first and second data in response to said knock detection signal and for supplying the readout data to said actuator means to thereby retard the ignition timing by an angle corresponding to the read out data, and said second means reads out said first data when it is detected that said engine is in the acceleration state and reads out the second data when the engine is in another operational state.

14. A method of operating a knock control system for an internal combustion engine including: sensor means for generating signals indicative of operating conditions of an engine; actuator means responsive to control signals to control engine conversion functions of said engine; knock sensing means for sensing the presence or absence of knocking in said engine and generating a knock detection signal indicative of an occurrence



of a knocking; and control circuit means responsive to the signals from said sensor means to perform engine controlling data processing operations and thereby supply engine control values to said actuator means, said control circuit means including memory means for storing a first data of ignition timing retard angle in an acceleration state and a second data of ignition timing retard angle which is less than said first data in engine operation states other than the acceleration state; the method comprising the steps of:

a first step of determining whether said engine is in an acceleration state or states other than the acceleration state in accordance with output signals from said sensor means;

a second step of reading out from said memory means selectively one of said first and second data in response to said knock detection signal in a manner such that said first is read out when it is determined that said engine is in the acceleration state and said second data is read out in another state; and

a third step of supplying the read out data to said actuator means from said control circuit means to thereby retard the ignition timing by an angle corresponding to the read out data.

4,710,882

ELECTRONIC POSTAGE METER HAVING A NONVOLATILE MEMORY SELECTION MEANS

Peter C. DiGiulio, Easton, and Henry Stalzer, Danbury, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

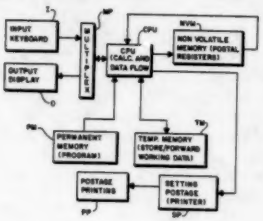
Filed Mar. 12, 1985, Ser. No. 710,871

Int. Cl.[4] G06F *13/00, 13/12, 7/04*

U.S. Cl. 364—464 **4 Claims**

1. In a postage meter having microprocessor for controlling the printing of postage value and for accounting for the printing of such postage value and at least two nonvolatile memories for storing information, said microprocessor being operative to read information from and write information to said nonvolatile memories, said microprocessor providing a write

strobe signal operative for enabling writing of information into said nonvolatile memories, nonvolatile memory selection means comprising a logic circuit for selecting one of said non-



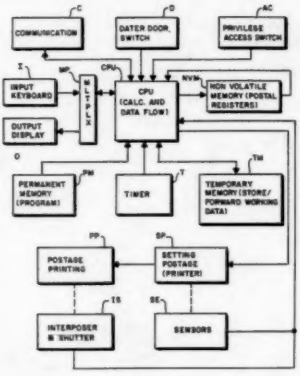
volatile memories in accordance with information from the microprocessor, and means for blocking said write strobe signal to said nonvolatile memories when neither of said nonvolatile memories is selected.

4,710,883

ELECTRONIC POSTAGE METER HAVING A STATUS MONITOR

Woody W. Wilson, Westport, and Nathaniel G. Wadsworth, Oxford, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Mar. 12, 1985, Ser. No. 710,898
Int. Cl.[4] G06F *15/20*; G06G *7/48*
U.S. Cl. 364—466 **7 Claims**



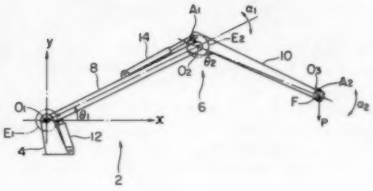
1. An electronic postage meter having a microcomputer for controlling determined tasks to be performed, means for printing postage in accordance with instructions communicated from said microcomputer, means for accounting for postage printed by said printing means, means coupled to said microcomputer for nonvolatile storage of the accounting information communicated from the microcomputer, means for providing operator-selectable data to said microcomputer, means for periodically providing to said microcomputer an interrupt signal for interrupting the current operation of the microcomputer, said microcomputer being operative upon receipt of such interrupt signal to monitor the status of at least one element of the postage meter and in response to the status thereof to schedule a queue of determined tasks to be performed by the electronic postage meter.

4,710,884

DEVICE FOR COMPENSATING FOR DEFLECTION IN A PLIABLE POSITIONING APPARATUS

Hiroaki Tokairin; Kazuo Honma; Kichio Nakajima; Kiyoshi Nagasawa, and Takeshi Aritake, all of Ibaraki, Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1985, Ser. No. 809,908
Claims priority, application Japan, Dec. 19, 1984, 59-266370
Int. Cl.[4] G06F *15/46*; G05B *19/42*
U.S. Cl. 364—513 **8 Claims**



1. A working apparatus of pliable structure having a support and an arm assembly pivotally connected to said support, said arm assembly including at least a first arm member, connected at one end to said support, and a second arm member pivotally connected to the first arm member at respective arm member ends and each being pivotally moved by a first actuator and a second actuator, respectively, and at least said second arm member having a working point, corresponding to an arm member end other than the pivotally connected arm member end, to which an external load is applied, wherein said apparatus comprises:

angle sensor means for sensing pivoting angles of the first arm member and second arm member, respectively;

load sensor means for sensing the external load applied to the work point of the second arm member;

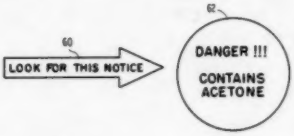
target position indication means for indicating the coordinate values of a target position of the working point of the second arm member; and

control means including deflection calculation means for inputting signals produced by said angle sensor means and said load sensor means and calculating a deflection of the arm assembly at the working point of the second arm member; pivoting angle calculation means responsive to signals produced by the target position indication means for calculating provisional pivoting angles for the first arm member and second arm member corresponding to the target position when the arm assembly is assumed to produce no deflection; and correcting angle calculation means for inputting signals produced by the deflection calculation means and pivoting angle calculation means and calculating, as correcting angles, pivoting angles for the first arm member and second arm member corresponding to the deflection in the position of the provisional pivoting angles; and means for activating the first actuator and second actuator so as to pivotally move the first and second arm members, respectively, as determined by sums of the provisional pivoting angles and correcting angles, respectively, to thereby correct an error caused by the deflection of the arm assembly in positioning the working point of the second arm member for achieving accurate positioning thereof at the target position.

4,710,885
GENERATING FIGURES IN A DOCUMENT FORMATTER DIRECTLY FROM A DECLARATIVE TAG

Mark A. Litteken, Hurley, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.

Filed Jul. 2, 1985, Ser. No. 751,172
Int. Cl.[4] G06F *15/62, 15/20;* B41B *19/00*
U.S. Cl. 364—518 9 Claims



3. A method of combining text and a grapic illustration enclosing said text in a document formatter, comprising the steps of:

attaching in a markup language a tag, indicating a type of graphic illustration, to a string of text, said graphic illustration being associated with said string of text and the size of said graphic illustration depending upon said string of text;

computing in a document formatting program markup language parameters associated with said string of text;

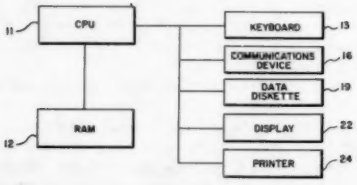
computing separate portions of said graphic illustration dependent on said parameters associated with said string of text; and

using a plurality of said computed portions to generate a graphic illustration enclosing said text in the formatted output of said program.

4,710,886
TABLE DRIVEN PRINT FORMATTING

Allen W. Heath, Cedar Park, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 24, 1984, Ser. No. 664,181
Int. Cl.[4] G06F *3/09, 15/02;* B41J *5/30*
U.S. Cl. 364—519 14 Claims



1. A word processing system for formatting a text data stream into a printable data stream of print commands to a printer including:

a central processing unit, a keyboard device, a display device, a pritner, a memory device, and a print formatting program, wherein said text data stream is formatted into said printable data stream by said print formatting program, said memory device having means to store:

a printer description table having at least one specific print command subsection and at least one general print command subsection;

printer status data which contains information describing the capabilities of and particular conditions within said printer;

said print formatting program having commands for selecting one of said print command subsections in response to said text data, said printer description table, and said printer status data, to place selected print commands into said printable data stream.

14. A method of formatting a printable data stream containing print commands from a text data stream comprising text commands and text data, including the steps of:

dividing a storage table in a memory into at least one specific print command subsection and at least one general print command subsection, each specific subsection including at least one print command and each general subsection including printer description data and a general print command shell which is an incomplete print command having empty positions for storage of one or more unspecified print command parameters which are to be subsequently calculated;

storing printer status data;

storing printer description data;

selecting one of said print command subsections in response to said text data, said printer status data and said printer description data;

placing a particular print command in said printable data stream when a specific print command has been selected;

constructing a parameter using said text data and said printer description data when a general print command has been selected;

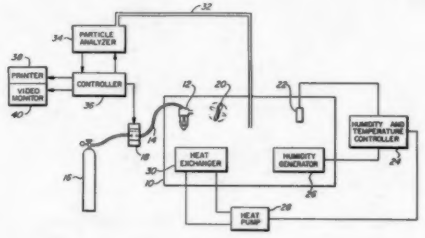
loading said parameter into said general print command shell to produce a dynamically created print command; and

placing said dynamically created print command into said printable data stream.

4,710,887
COMPUTER CONTROLLED CONSTANT CONCENTRATION AND SIZE PARTICULATE GENERAL SYSTEM

Jim Y. W. Ho, Medicine Hat, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Jun. 17, 1985, Ser. No. 745,167
Claims priority, application Canada, Aug. 21, 1984, 461480
Int. Cl.[4] G01N *15/02*
U.S. Cl. 364—555 3 Claims



1. An aerosol generating system comprising:

(a) a closed chamber;

(b) an aerosol generator in the chamber;

(c) means for generating an air flow within the chamber to distribute aerosols therein;

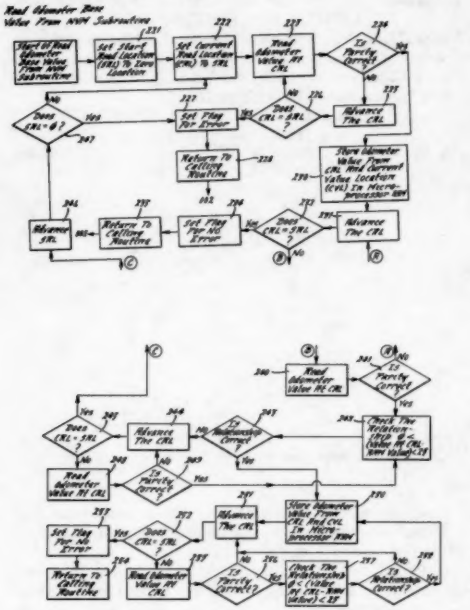
(d) a particle analyzer connected to the chamber to draw aerosol samples therefrom and to monitor particle size range of the aerosol; and

(e) control means responsive to signals from the analyzer representative of changes in said particle size range to control operation of the aerosol generator so as to maintain said particle size substantially constant.

4,710,888
ELECTRONIC ODOMETER

Michael J. Burke, Detroit; Richard A. Pidsosny, Canton, and Gerald J. Lehner, Westland, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 1, 1984, Ser. No. 656,626
Int. Cl.[4] G06F 15/20
U.S. Cl. 364—561 18 Claims



7. In an electronic odometer, a method of reading data from a non-volatile memory (NVM) device having data stored in one or more of a predetermined number of sequentially ordered storage locations including the following ordered steps of:

(a) selecting a storage location in said NVM as a starting read location;

(b) reading the data value present in the selected read location;

(c) comparing parity coded portions of the read data value with predetermined correct parity values to determine if said read data value is parity correct or not;

(d) advancing the reading location to the next sequential location in said NVM and repeating steps (b) and (c) only until the selected reading location is again equal to said starting reading location when said compared parity in step (c) is incorrect;

(e) providing a data error indication and ending said method when said compared parity in step (c) is incorrect and said reading location is again equal to said starting read location;

(f) temporarily storing the read data value in another memory device when the compared parity of step (c) is correct;

(g) advancing the selection of the reading location to the next sequential location in said NVM;

(h) providing said temporarily stored data value as a correct base odometer value and ending said method only when said selected read location is again equal to said starting read location;

(i) reading the data value present in the advanced read location;

(j) comparing the parity coded portions of the read data value with predetermined correct parity values to determine if said read data value is parity correct or not;

(k) repeating sequential steps of (g) through (j) when said compared parity in step (j) is incorrect;

(l) comparing the data value read in step (i) with the value temporarily stored in said other memory device when said compared parity in step (j) is correct to determine if said value read is within a predetermined relationship established with respect to the temporarily stored value;

(m) replacing the previously temporarily stored data in step (f) with the read data value compared in step (l) when that read data value is within the predetermined relationship established with respect to the previously temporarily stored value;

(n) repeating steps (g) through (m);

(o) repeating step (g) when the read data value compared in step (l) is without the predetermined relationship established with respect to the previously temporarily stored value;

(p) repeating steps (i) through (m) only until the selected read location is again equal to said starting read location;

(q) advancing the selection of the starting read location to the next sequential location in said NVM;

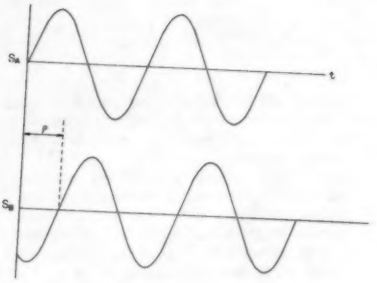
(r) repeat steps (b) through (q) only until the starting read location is again equal to the starting read location selected in step (a); and

(s) providing a data error indication and ending said method when said starting read location is again equal to the starting read location selected in step (a).

4,710,889
ANGULAR POSITION DETECTOR

Thomas D. Wason, Raleigh, N.C., assignor to Cain Encoder Co., Greenville, N.C.

Division of Ser. No. 516,714, Jul. 25, 1983, Pat. No. 4,606,008.
This application Aug. 8, 1986, Ser. No. 894,637
Int. Cl.[4] G01C 17/38
U.S. Cl. 364—571 7 Claims



1. In a device for detecting the position of a rotating member with respect to a predetermined zero position, said device being of the type wherein a transducer confronts said rotating member and is electrically coupled thereto to provide a resultant electric signal indicative of said hand position; and wherein the indicated hand position may be in variance with the actual hand position because of fluctuation in the distance of the transducer from the rotating member, and further wherein such distance variance is related to a variance in the anticipated amplitude of the resultant electric signal, a method for compensating for said distance variance comprising the steps of:

(a) determining the amplitude of resultant electric signal;

(b) generating an amplitude cmopensation value based on said amplitude;

(c) adding the amplitude compensation value to said resultant electric signal to provide a corrected value indicative of the compensated hand position.

3. In combination with an encoding apparatus for detecting the position of a rotating member with respect to a predetermined zero position, said apparatus being of the type in which a transducer confronts said rotating member and is electrostatically or electromagnetically coupled thereto to detect a resultant signal indicative of said position thereof, and wherein the indicated position may be in variance with the actual position because of a fluctuation in the distance of the transducer from the rotating member, and further wherein such distance variance is related to a variance in the anticipated amplitude of the resultant electric signal, a means for compensating for the effect of said distance variation, said means comprising:

(a) measuring means for determining the amplitude of said detected resultant, position indicating electric signal;

(b) computational means for generating a compensation value based upon said amplitude; and

(c) combinatorial means for adding said compensation value to said resultant electrical signal.

4,710,890

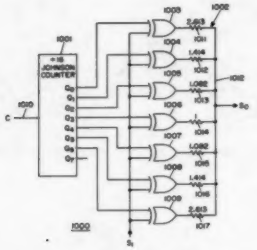
BALANCED MIXER

George Bailey, Montgomery County, Md., assignor to Hekimian Laboratories, Inc., Gaithersburg, Md.

Filed Sep. 5, 1985, Ser. No. 772,870

Int. Cl.[4] H03B *19/00*

U.S. Cl. 364—703 **9 Claims**



1. A balanced mixer for multiplying a first and a second signal and forming the product thereof comprising:

output means for providing the product of the first and second signals;

counter means having an input for receiving a periodic digital clock signal and a plurality of sequentially-ordered outputs including a first output, providing respective periodic digital output signals having a frequency which is a predetermined fraction of the frequency of the clock signal, the digital output signals being suitable for generating a discrete approximation of the first signal by appropriately weighting and summing such digital output signals;

a plurality of signal weighting means, each one corresponding to a respective operative one of the outputs of the counter means and having a first and a second terminal, the first terminal of each signal weighting means being coupled in a signal summing arrangement to the output means, each signal weighting means having a value such that if the second terminals of the signal weighting means are coupled to the corresponding operative output of the counter means, the output means provides a discrete approximation of the first signal; and

a plurality of EXCLUSIVE OR means each one having a first input coupled to a particular operative one of the outputs of the counter means, a second input coupled to receive the second signal and an output coupled to the second terminal of the signal weighting means corresponding to the particular operative one of the outputs of the counter means.

4,710,891

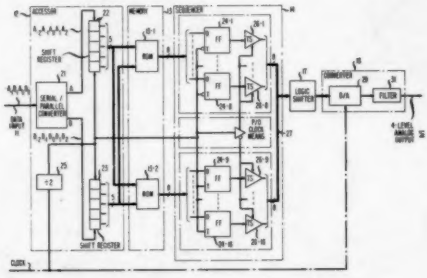
DIGITAL SYNTHESIS TECHNIQUE FOR PULSES HAVING PREDETERMINED TIME AND FREQUENCY DOMAIN CHARACTERISTICS

Walter Debus, Jr., Nottingham; Thomas L. Osborne, Sandown, both of N.H., and Curtis A. Siller, Jr., Andover, Mass., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 27, 1983, Ser. No. 517,803

Int. Cl.[4] G06F *1/02*

U.S. Cl. 364—718 **9 Claims**



1. Apparatus for synthesizing a multi-level coded signal with predetermined time domain and frequency domain characteristics in response to a binary input data stream;

said signal defined in terms of discrete amplitude states, each amplitude state corresponding to a symbol representing a unique group of at least two input bits, said apparatus comprising:

accessing means for converting a predetermined number greater than one, m, of said symbols into at least one address, said accessing means comprising accumulating means for accumulating m symbols in respective successive address positions and shifting means for shifting each of said symbols one address position to change the address at the symbol rate, each new address comprising one new symbol and m−1 old symbols;

digital output means comprising memory means addressed by said accessing means for producing at least two digital representations for each symbol period;

said digital representations corresponding to a composite formed by the superposition of m individual and identical impulse time functions temporally displaced one from another by the symbol interval, each function weighted according to the discrete amplitude state and temporally displaced according to the position in the input data stream of the respective corresponding symbol of the m symbols forming said at least one address; and

digital-to-analog converting means connected to said digital output means for converting said digital representations to said multi-level coded signal.

4,710,892

PHASE CALCULATION CIRCUITRY IN DIGITAL TELEVISION RECEIVER

Russell T. Fling, Noblesville, Ind., assignor to RCA Corporation, Princeton, N.J.

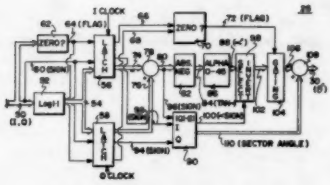
Filed Oct. 29, 1984, Ser. No. 666,020

Int. Cl.[4] G06F *7/347, 7/556*; H04N *9/64*

U.S. Cl. 364—729 **4 Claims**

1. Apparatus for generating the instantaneous phase value θ

of the vector sum C of a pair of quadrature-related signal components I and Q with respect to one of said signal components I; said apparatus comprising:



(a) means for receiving a pair of instantaneous magnitude values of said orthogonal signal components I and Q;
(b) means for calculatiang a value equal to:

$$\tan \alpha = \frac{\text{Smaller of said magnitude values}}{\text{Larger of said magnitude values}}$$

(c) a source of coefficient values K_ι, where ι is an index varying from 1 to 2;
(d) means for calculating the logarithm of tan α to the base B, hereinafter $\text{Log}_B(\tan \alpha)$; wherein said logarithm calculating means comprises a ROM to which the value of tan α is applied as an address code, and which is programmed to contain the associated $\text{Log}_B(\tan \alpha)$ values at the respective memory locations;
(e) first means for adding to the value of $\text{Log}_B(\tan \alpha)$ a value equal to $\text{Log}_B(M) + \text{Log}_B(K_1)$, where M is a constant;
(f) first means for determining the antilogarithm of the output of said first adding means;
(g) means for multiplying the value of $\text{Log}_B(\tan \alpha)$ by a factor of 2;
(h) second means for adding to the output of said multiplying means a value equal to $\text{Log}_B(M) + \text{Log}_B(|K_2|)$ to the base B;
(i) second means for determining the antilogarithm of the output of said second adding means;
(j) means for combining the output of said first antilogarithm determining means with the output of said second antilogarithm determining means to generate the value α'; and
(k) means for transposing the angle α' to the corresponding phase angle θ of the vector sum C.

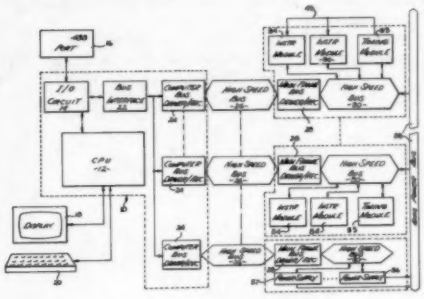
4,710,893

HIGH SPEED INSTRUMENT BUS

Samuel McCutcheon, Saratoga; Jeffrey Lum, Fremont; Roman Solek, Mountain View; Troy Harrell, Sunnyvale, and Robert Leman, San Jose, all of Calif., assignors to Autek Systems Corporation, Santa Clara, Calif.

Filed Jun. 22, 1984, Ser. No. 623,381
Int. Cl.[4] G06F *13/00*
U.S. Cl. 364—900 **30 Claims**

1. A system for high speed, address independent data and command transferral between a computer and a plurality of instrument modules, comprising:
a high speed bus comprised of a plurality of multipurpose lines and buses;
a data bus and a command bus in said high speed bus coupled to said computer and to each of said instrument modules;
a module polling means coupled to said computer wherein, after power up of said computer, said polling means sequentially polls each of said instrument modules by issuing a model identification number on said command bus to which each of said instrument modules may be coupled;
a data transmission and reception means respectively coupled to said computer, to said data bus, to said command bus and to each of said instrument modules for transmitting and receiving data over said data bus and said command bus in accordance with a desired instrument operation defined by a function code;
a first storage means in each of said instrument modules for storing instrument means identification numbers, wherein said data transmission and reception means transmits said module identification number to said computer upon receipt of said model identification number by said reception means;
a second storage means in said computer for storing said instrument module identification number received from said instrument modules in a poll table wherein said poll table associates an address slot in said poll table with said identified module thereby allowing any module to be associated with any slot;
function code generation means coupled to said computer for generating a function code (#0 . . . N) corresponding to a desired instrument operation and transmitting to said instrument modules said code on said command bus;
a plurality of enable lines coupled to said computer and each of said instrument modules;
module enabling means coupled to said computer and each of said enabling lines for sequentially generating an enable signal and transmitting said enable signal on an enable line connected to a selected instrument module, such that said selected instrument module is enabled for data transfer and function code reception;



a function code receiving means coupled to each of said instrument modules, said enable line and said command bus for decoding said function code provided to said enabled instrument module into a unique operation for execution by said instrument module on receipt of said enable signal;
whereby a high speed data transfer occurs as a result of associating said instrument identification number in said poll table with an associated address slot and an associated function code such that said instrument modules can be coupled to any slot.

17. A method for transferring data and commands at high speed between a computer and a plurality of instrument modules comprising the steps of:
said computer, upon power-up, sequentially generating model identification code signals to each of said instrument modules;
said instrument module transmitting an instrument module identification number onto a data bus coupled to said computer and each of said instrument modules;
said computer storing said instrument module identification number received from each of said instrument modules in a poll table;
said computer associating an address slot in said poll table with each of said module identification numbers;
said computer generating a digital function code (#0 . . . N) corresponding to a desired instrument operation and transmitting said function code on a command bus cou-

pled to said computer and to each of said instrument modules;

said computer generating a module enable signal and transmitting said signal on one of a plurality of enable lines coupled to said computer and to each of said instrument modules such that said selected instrument module is enabled for data transfer and function code reception;

said enabled instrument module decoding said function code into a unique operation to be executed by said instrument module upon receipt of said enabled signal;

said enabled instrument module transmitting and receiving data on a data bus coupled to said computer and to each of said instrument modules in accordance with a desired instrument operation defined by said function code;

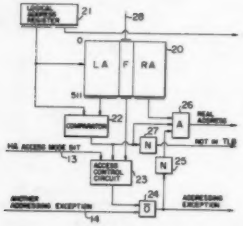
whereby said enabled instrument module executes said desired operation corresponding to said function code and associates said instrument module with an address slot such that said instrument module can be coupled to any slot.

4,710,894

ACCESS CONTROL SYSTEM FOR STORAGE HAVING HARDWARE AREA AND SOFTWARE AREA

Kanji Kubo, and Katsuro Wakai, both of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 15, 1984, Ser. No. 671,618
Claims priority, application Japan, Nov. 16, 1983, 58-215555
Int. Cl.[4] G06F *12/06*
U.S. Cl. 364—900 **6 Claims**



1. An access control system for storage, adapted to be used in a data processing system in which a storage is divided into a hardward area inaccessible to ordinary programs and a software area for storing the ordinary programs, and in which the access to said storage is controlled in accordance with an address which accesses said storage and an access mode which indicates whether said data processing system is accessible to the hardware area or not, said access control system comprising:

addressing registration means having a plurality of entries, for reading out the contents of an entry corresponding to an address at which said storage is to be accessed, each of said entries containing a previously-used address of said storage and a flag for indicating whether said previously-used address is included in said hardware area or not, said address registration means including means for outputting a signal which indicates whether said to-be-accessed address of said storage is present in said address registration means or not, on the basis of the outputted contents of said entry; and

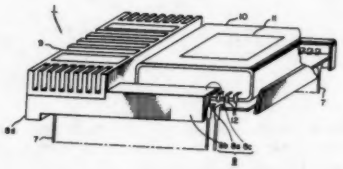
access control means for controlling the access to said storage, in accordance with the access mode of said data processing system, said flag, and said signal from said address registration means.

4,710,895

MAGNETIC BUBBLE MEMORY MODULE WITH PROTECTED TERMINALS

Harumi Maegawa; Sakan Takai, both of Kawasaki; Toshiaki Sukeda, Suzaka; Shoji Irie, Nagano, and Shoichi Kobata, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed May 7, 1985, Ser. No. 731,487
Claims priority, application Japan, May 7, 1984, 59-91457
Int. Cl.[4] G11C *19/08*
U.S. Cl. 365—2 **12 Claims**



1. A magnetic bubble memory module comprising:

a magnetic bubble memory device having a plurality of lead terminals extending therefrom;

a plurality of analog peripheral circuits for driving and controlling said magnetic bubble memory device;

a plurality of outer lead terminals for receiving input signals for said analog peripheral circuits and for sending output signals from said analog peripheral circuits;

a substrate on the top surface of which said magnetic bubble memory device, analog peripheral circuits and outer lead terminals are mounted; and

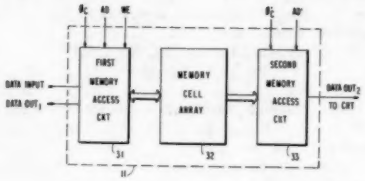
protection means of insulative material for protecting said lead terminals of said magnetic bubble memory device from electrostatic discharge damage caused by contact with a charged body, said protection means comprising a frame-like portion having an inner wall with a step-like portion and an abutting surface on said step-like portion, said substrate being inserted inside said frame-like portion and supported by said step-like portion in contact with said abutting surface, and being fixed rigidly to said frame-like portion of said protection means.

4,710,896

SEMICONDUCTOR MEMORY HAVING MULTIPLE ACCESS

Akira Nagami, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 7, 1984, Ser. No. 648,225
Claims priority, application Japan, Sep. 7, 1983, 58-164475
Int. Cl.[4] G11C *11/24*
U.S. Cl. 365—149 **9 Claims**



1. A semiconductor memory, comprising: first word lines, first digit lines arranged vertically with respect to said first word lines, second word lines, second digit lines arranged vertically with respect to said second word lines, and a plurality of memory cells, each of said memory cells including a first capacitor means having one end connected to a fixed potential line, a second capacitor means having one end connected to said fixed potential line, a first field effect transistor coupled

between another end of said first capacitor means and an associated one of said first digit lines and having a gate coupled to an associated one of said first word lines, a series circuit of second and third field effect transistors coupled between the other end of said first capacitor means and another end of said second capacitor means, a gate of said second transistor being connected to said associated one of said first word lines, a gate of said third transistor being supplied with a write selection signal, and a fourth field effect transistor coupled between the other end of said second capacitor means and an associated one of said second digit lines and having a gate coupled to an associated one of said second word lines.

4,710,897

SEMICONDUCTOR MEMORY DEVICE COMPRISING SIX-TRANSISTOR MEMORY CELLS

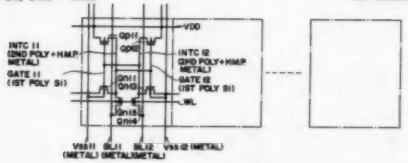
Fujio Masuoka, and Kiyofumi Ochii, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

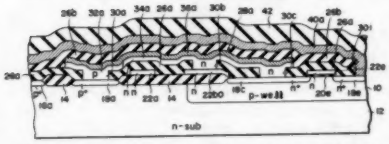
Filed Apr. 24, 1985, Ser. No. 726,698

Claims priority, application Japan, Apr. 27, 1984, 59-85617; Apr. 27, 1984, 59-85618; Nov. 30, 1984, 59-253026; Nov. 30, 1984, 59-253027

Int. Cl.[4] H01L *27/10, 29/04, 23/50;* **G11C** *11/40*

U.S. Cl. 365—182 **16 Claims**





1. A semiconductor device with six-transistor memory cells provided in matrix form, each said memory cell comprising:

a first-channel type first MOS transistor having a source, drain, gate and substrate region;

a second-channel type second MOS transistor having a source, drain, gate and substrate region, the gates of said first and second MOS transistors being formed of a first portion of a first polycrystalline silicon layer which includes impurities for providing conductivity, and said first and second MOS transistors being electrically connected to form a first CMOS inverter;

a first-channel type third MOS transistor having a source, drain, gate and substrate region;

a second-channel type fourth MOS transistor having a source, drain, gate and substrate region, the gates of said third and fourth MOS transistors being formed of a second portion of the first polycrystalline silicon layer which includes impurities for providing conductivity, and said third and fourth MOS transistors being electrically connected to form a second CMOS inverter;

a second-channel type fifth MOS transistor for data transfer having a source, drain, gate and substrate region, the source of said fifth MOS transistor being connected to the drain of said second MOS transistor;

a second-channel type sixth MOS transistor for data transfer having a source, drain, gate and substrate region, the source of said sixth MOS transistor being connected to the drain of said fourth MOS transistor, and the gates of said fifth and sixth MOS transistors being connected to a word line;

first potential supplying means coupled to the sources of said first and third MOS transistors for supplying a first potential to the sources of said first and third MOS transistors;

second potential supplying means for supplying a second potential to the sources of said second and fourth MOS transistors;

first connection means for connecting the gate of said first MOS transistor, the drain of said third MOS transistor, and the drain of said fourth MOS transistor via first contact holes, said first connection means including

an impurity-doped first portion of a second polycrystalline silicon layer

a first high-melting point metal layer and being formed on a first interlayer insulation film which is formed on the first and second portions of the first polycrystalline silicon layer, said first high-melting point layer being arranged to decrease the resistance value of said impurity-doped first portion of second polycrystalline silicon layer;

second connection means for connecting the gate of said third MOS transistor, the drain of said first MOS transistor, and the drain of said second MOS transistor via second contact holes, said second connection means including

an impurity-doped second portion of said second polycrystalline silicon layer, and

a second high-melting point metal layer being formed on said first interlayer insulation film, said second high-melting point layer being arranged to decrease the resistance value of said impurity-doped second portion of said second polycrystalline silicon layer;

a second interlayer insulation film formed on said first and second connection means;

a first metal interconnection layer provided on said second interlayer insulation film for connecting said second potential supply means to the source and the substrate region of said second MOS transistor via a third contact hole provided in said second interlayer insulation film;

a second metal interconnection layer provided on said second interlayer insulation film for connecting said second potential supplying means to the source and said substrate region of said fourth MOS transistor via a fourth contact hole provided in the second interlayer insulation film, said first and second metal interconnection layers being shared by adjacent memory cells;

a third metal interconnection layer, provided on said second interlayer insulation film and connected to the drain of said fifth MOS transistor via a fifth contact hole formed in said second interlayer insulation film, for functioning as a first bit line; and

a fourth metal interconnection layer, provided on said second interlayer insulation film and connected to the drain of said sixth MOS transistor via sixth contact hole formed in said second interlayer insulation film, for functioning as a second bit line.

4,710,898

APPARATUS FOR PERFORMING DESIRED LOGICAL FUNCTION

Masahiko Sumi, Chigasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 27, 1985, Ser. No. 716,388

Claims priority, application Japan, Mar. 28, 1984, 59-59882

Int. Cl.[4] G11C *13/00*

U.S. Cl. 365—189 **15 Claims**

1. An apparatus for performing a desired logical function comprising:

an AND array having

input lines through which logical variables are inputted,

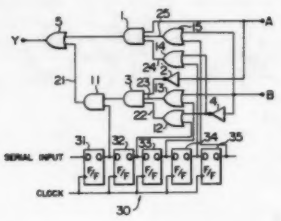
one or more product term lines intersecting the input lines, and

first unit circuits positioned at the respective points where the input lines and the product term lines intersect and connected to the input lines and the product term lines, each of the first unit circuits having

a first storage means for storing information which determines whether the product term line connected to the first unit circuits is to be sensitized or desensitized and

a first means for selectively sensitizing or desensitizing the product term line on the basis of the information stored in the first storage means,

the AND array generating desired logical products of the logical variables on the respective product term lines; and an OR array having



signal lines connected to the product term lines, respectively,

one or more output lines intersecting the signal lines, and second unit circuits positioned at the respective points where the signal lines and the output lines intersect, each of the second unit circuits having

a second storage means for storing information which determines whether the output line connected to the each of the second unit circuits is to be sensitized or desensitized and

a second means for selectively sensitizing or desensitizing the output line on the basis of the information stored in the first storage means,

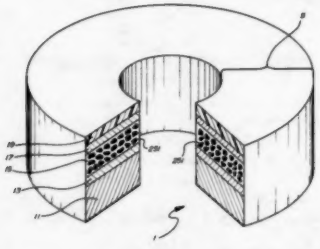
the OR array generating a desired logical sum of the logical products on the respective output lines.

4,710,899

DATA STORAGE MEDIUM INCORPORATING A TRANSITION METAL FOR INCREASED SWITCHING SPEED

Rosa Young, Troy, and Stanford R. Ovshinsky, Bloomfield Hills, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Jun. 10, 1985, Ser. No. 742,813
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—113 **2 Claims**



1. A data storage device having a layer of non-ablative chalcogen phase change data storage medium switchable between detectable states differing in local order by the application of projected beam energy thereto, the data storage medium comprising:

(a) a chalcogen chosen from the group consisting of Te, Se, and mixtures thereof; and

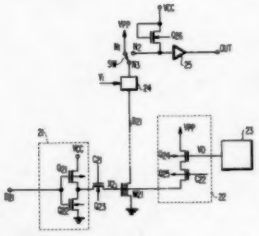
(b) a transition metal switching modulator chosen from the group consisting of Ni, Pd, Pt, and combinations thereof; the transition metal switching modulator increasing the switching speed and the switching sensitivity from the less ordered state to the more ordered state, increasing the signal to noise ratio, and increasing the randomness of orientation of crystallites of the more ordered state.

4,710,900

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE HAVING AN IMPROVED WRITE CIRCUIT

Misao Higuchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 30, 1985, Ser. No. 814,472
Claims priority, application Japan, Dec. 28, 1984, 59-277434
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—189 **15 Claims**



1. A non-volatile semiconductor memory device comprising:

a plurality of row lines;

a plurality of column lines;

a plurality of non-volatile memory cells each coupled to one of said row lines and one of said column lines;

a row selection circuit responsive to row address information for selecting one of said row lines;

a write voltage terminal to which a write voltage is applied; and

a plurality of write voltage application circuits each coupled between each one of said row lines and said write voltage terminal for applying said write voltage thereto in a write state, each of said write voltage application circuits including a current limiting MIS transistor of an enhancement type through which a limited amount of current flows and means for connecting a source-drain path of said current limiting transistor between said row line and said write voltage terminal.

4,710,901

DRIVING CIRCUIT FOR A SHARED SENSE AMPLIFIER

Masaki Kumanoya; Kazuyasu Fujishima, and Katsumi Dosaka, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

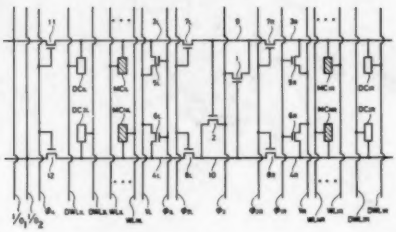
Filed Aug. 19, 1985, Ser. No. 767,193
Claims priority, application Japan, Aug. 17, 1984, 59-172005
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—190 **10 Claims**

1. A driving circuit for a shared sense amplifier which drives at a high speed a shared sense amplifier circuit including two pairs of it lines (3_R, 4_R and 3_L, 4_L) respectivey connected with memory cells (MC_{1R}, MC_{NR} and MC_{1L}, MC_{NL}), a sense amplifier (1, 2) provided between said two pairs of bit lines for amplifying information read from said memory cells, a first transfer transistor group (7_R, 8_R or 7_L, 8_L) interposed between

one of said pairs of bit lines (3_R, 4_R or 3_L, 4_L) and said sense amplifier and a secnd transfer transistor group (7_L, 8_L or 7_R, 8_R) interposed between the other pair of bit lines (3_L, 4_L or 3_R, 4_R) and said sense amplifier (1, 2) thereby to share said sense amplifier by said two pairs of bit lines (3_R, 4_R and 3_L, 4_L), said driving circuit comprising:

a clamp clock generation circuit for generating a clamp clock (ϕ_5) respondig at a high speed to addressing of said memory cells;

a decoder for decoding said clamp clock (ϕ_5); and



on-off control means for controlling on-off operations of said first and second transfer transistor groups on the basis of an output from said decoder,

said on-off control means including clamp means for clamping, upon addressing of any one of said memory calls, the gate voltage of said transfer transistor group interposed between the pair of bit lines not connected with said addressed memory cell and said sense amplifier, said gate voltage equal to the precharge voltage of said bit lines thereby to turn off said transfer transistor group.

4,710,902

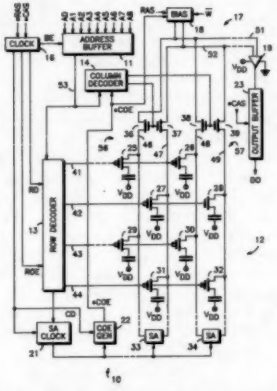
TECHNIQUE RESTORE FOR A DYNAMIC RANDOM ACCESS MEMORY

Perry H. Pelley, III, Austin, and Bruce L. Morton, Round Rock, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 4, 1985, Ser. No. 784,449

Int. Cl.[4] G11C *7/00, 11/24, 11/34*

U.S. Cl. 365—222 **13 Claims**



1. A dynamic random access memory, comprising:

a plurality of bit lines;

a plurality of word lines intersecting the plurality of bit lines;

a plurality of refreshable memory cells located at respective intersections of the bit lines and the word lines, each memory cell providing a signal to its respective bit line indicative of data stored therein in response to its respective word line being enabled;

address input means for sequentially receiving a row address then a column address, providing said row address as an output in response to a first externally generated clock signal being active, and providing said column address as an output after providing said row address;

row decoder means for enabling a selected word line in response to receiving the row address from the address input means;

a plurality of sense amplifiers, coupled to respective bit lines, each for amplifying the signal on the respective bit line provided by the memory cell coupled to the respective bit line and the enabled word line;

column decoder means for coupling a selected bit line to a common data line in response to receiving the column address signal from the address input means and for decoupling the selected bit line from the common data line in response to a second externally generated clock signal becoming inactive;

a secondary sense amplifier, coupled to the common data line, for amplifying the signal coupled to the common data line from the selected bit line, and for providing an output indicative thereof;

output means for coupling the output of the secondary sense amplifier to an output of the memory in response to the second externally generated clock signal being active; and

restore means for holding the selected word line in the enabled state a predetermined time delay following the second externally generated clock signal becoming inactive;

whereby the memory cell coupled to the selected bit line is fully refreshed in response to the second externally generated clock signal being inactive.

4,710,903

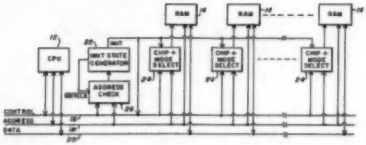
PSEUDO-STATIC MEMORY SUBSYSTEM

Michael R. Hereth, and Patricia A. Martin, both of Westford, Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 31, 1986, Ser. No. 846,328

Int. Cl.[4] G11C *11/40*

U.S. Cl. 365—194 **26 Claims**



1. A memory subsystem comprising memory devices which may be placed in a standby mode or in a low power mode in which greater access time is required, the subsystem comprising:

means for placing the memory devices in the low power mode;

means for selectively accessing discrete blocks of memory which are in either the standby mode or the low power mode;

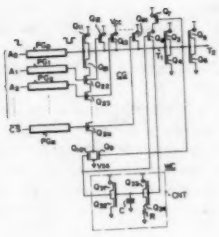
means for delaying access to a block of memory which is in the low power mode; and

means for retaining an accessed block of memory in the standby mode and for preventing delay of subsequent access to the retained block of memory.

4,710,904
CONSTANT PULSE WIDTH GENERATOR INCLUDING TRANSITION DETECTORS

Atsushi Suzuki, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Aug. 21, 1985, Ser. No. 767,873
Claims priority, application Japan, Aug. 23, 1984, 59-175392
Int. Cl.[4] G11C 7/00
U.S. Cl. 365—226 8 Claims



1. A semiconductor circuit operatively connected to a power supply having first and second terminals of opposite polarity, comprising:

at least one input-change detecting circuit, operatively connected to the first and second terminals of the power supply, having a first output end for generating a pulse in response to a change of an input signal;

a gate circuit, operatively connected to the first and second terminals of the power supply, having an input end operatively connected to said first output end and having a second output end, for changing an output signal when the input signal changes;

an inverter, operatively connected to said second output end and the first and second terminals of the power supply, having a third output end; and

a pulse-width fixing circuit, operatively connected to the first and second terminals of the power supply and said second output end of said gate circuit, for latching the output signal of said gate circuit in response to a signal change at said second output end of said gate circuit and for resetting the output signal a predetermined time after the onset of the latching, comprising:

first and second transistors connected in series between the first terminal of the power supply and said second output end of said gate circuit, said first and second transistors having gate electrodes, the gate electrode of said first transistor operatively connected to said third output end;

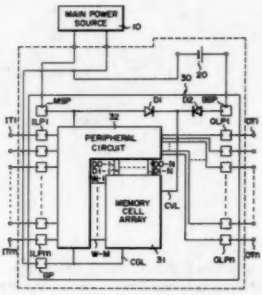
reset means, operatively connected to the gate electrode of said second transistor, for resetting the latching after a predetermined time delay from the onset of the latching; and

a control circuit, operatively connected to the first and second terminals of the power supply, having an input end connected to said second output end and having a reset output end connected to said reset means, said control circuit including a delay circuit for transferring a signal change at said input end of said control circuit to said reset output end with the predetermined time delay to control said reset means.

4,710,905
SEMICONDUCTOR MEMORY DEVICE

Yukimasa Uchida, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 650,105, Sep. 13, 1984. This application Aug. 4, 1986, Ser. No. 894,494
Claims priority, application Japan, Sep. 16, 1983, 58-170693
Int. Cl.[4] G11C 11/40
U.S. Cl. 365—229 6 Claims



1. A semiconductor memory device comprising:

a main power source pad, a back-up power source pad and a reference power supply source pad;

first and second unidirectional circuit elements;

a first power supply line coupled to said main power source pad and said back-up power source pad through said first and second unidirectional circuit elements, respectively, wherein electrical current flows to said first power supply line from whichever one of said main and back-up power source pads has a larger potential;

a second power supply line coupled to said reference power supply source pad; and

a semiconductor memory receiving an address signal, a data signal and a control signal at input terminals and including

a cell array coupled between said first and second power supply lines and including a plurality of memory cells which are rendered operative by application of a potential difference between said first and second power supply lines, and

peripheral circuit means, coupled to said input terminals to receive said address signal, data signal, and control signal, coupled between said main power source pad and said reference power source pad, and coupled to said semiconductor memory cell array by data lines transferring data directly with said memory cells and by word lines for selecting said cells, for enabling the reading of data from and writing data into said semiconductor memory cell array, said peripheral circuit means being isolated from said first power supply line by one of said unidirectional circuit elements such that said peripheral circuit means is not rendered operative when a potential difference between said main power source pad and said reference power source pad is lower than a potential difference between said first and second power supply lines.

4,710,906
METHOD AND SYSTEM FOR MONITORING THE STABILITY OF BOREHOLES

William B. Bradley, Dallas, and Philip Holbrook, Houston, both of Tex., assignors to NL Industries, Inc., New York, N.Y.

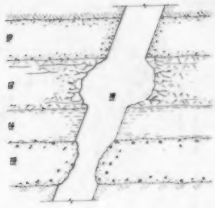
Filed Jul. 30, 1986, Ser. No. 891,773
Int. Cl.[4] G01V 1/00
U.S. Cl. 367—35 2 Claims

1. A method for monitoring the stability of an earth borehole

through a shale formation, said borehole containing drilling fluid, comprising the steps of:

running, at a first point in time, a well logging instrument through the borehole along the shale formation of interest, while taking an initial measurement of a characteristic of said shale formation;

running, at a second point in time subsequent to said first



point in time, a well logging instrument through the borehole along said shale formation of interest, while taking a second measurement of said characteristic of said shale formation; and

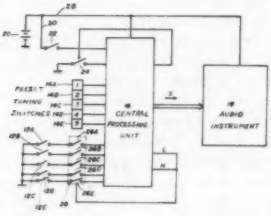
combining said first and second measurements to determine the extent to which the shale formation of interest has swelled due to the interaction of the drilling fluid in the borehole with the said shale formation.

4,710,907

OPERATION PROHIBITION DEVICE FOR AN AUDIO INSTRUMENT

Kozo Kobayashi, Kodaira, and Hideo Goto, Mitaka, both of Japan, assignors to Nakamichi Corporation, Kodaira, Japan

Filed Sep. 26, 1983, Ser. No. 536,162
Claims priority, application Japan, Oct. 29, 1982, 57-189246
Int. Cl.[4] H04B *1/20*
U.S. Cl. 369—6 **4 Claims**



1. An operation prohibition device for an audio instrument which is able to be operated by operating switches on condition that said audio instrument is connected to a power source and that a power switch is closed, said operation prohibition device comprising;

a first power source line connecting said power source to said audio instrument not through said power switch;

a second power source line connecting said power source to said audio instrument through said power switch;

means to monitor predetermined operation steps of said audio instrument and to forcibly prohibit an operation of said audio instrument by said operating switches when

two successive steps of connecting said audio instrument to said power source which is detected by monitoring said first power source line and of the closing of said power switch which is detected by monitoring said second power source line are performed;

manually operable means to generate a recitation code number as a cancellation signal;

means to release said forcible prohibition means when a correct recitation code number has been generated as a cancellation signal, wherein

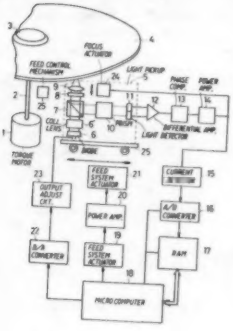
said audio instrument is prohibited from its operation when said audio instrument is disconnected from said power source through said first and second power source lines and then reconnected to said power source through said first power source line and then through said second power source line by closing said power switch, and wherein said audio instrument is not prohibited from its operation when said audio instrument is connected to said power source through said second power source line by closing said power switch upon the condition that said audio instrument remains connected to said power source only through said first power source line by opening said power switch.

4,710,908

SERVO APPARATUS FOR COMPENSATING FOR WARP AND DEFLECTION DEVIATIONS ON OPTICAL DISCS

Ken Ohshima, and Tadashi Shimizu, both of Tokyo, Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan

Filed Sep. 19, 1984, Ser. No. 652,451
Claims priority, application Japan, Sep. 20, 1983, 58-173845
Int. Cl.[4] G11B *7/00, 7/09*
U.S. Cl. 369—32 **3 Claims**



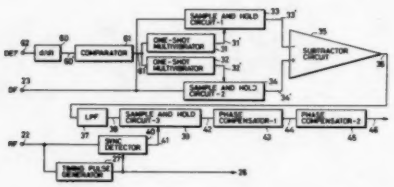
1. In an apparatus for optically recording and reproducing information having a rotationally driven optical information record medium, optical light pickup means having means for developing a light beam and optical focusing lens for focusing the light beam as a spot of light on a record surface of the information record medium, means for displacing the light pickup means in a radial direction relative to the record surface of the information record medium to given addresses defined on the record surface to which said light pickup means moves, the light beam and lens are positioned relative to the record medium during rotation thereof, detection means including the optical pickup means scanning the record surface prior to recording thereon and detecting physical deviations of the record surface relative to the plane of the record surface caused by warp and record surface radial deflections and including means to develop focus error signals of the lens including focus error signals representative of an out-of-focus distance relative to the record surface corresponding to values of the physical deviations corresponding to respective addresses on the record surface, means for generating correction current signals necessary to position the lens in-focus in a position compensating for the out-of-focus distance due to corresponding physical deviations on the record surface, means for detecting and measuring correction current values of current necessary to position the lens in-focus in a position compensating for the out-of-focus distance due to the storing correction information for correcting positioning of the lens in-focus including correction information developed from the

correction current values for correction of the spot of light intensity corresponding to the current values representative of the individual physical deviations and to the individual respective addresses thereof on said record surface, control means effective during read and write operations for positioning the focusing lens at in-focus positions relative to the record surface compensating for said physical deviations so that the light beam is applied to the record surface in an in-focus condition during both recording and reproducing modes of operation of said apparatus, and power varying means for varying the intensity of the spot of light as a function of the correction information to compensate for spot intensity changes caused by said physical deviations on the record surface.

4,710,909
PHASE COMPENSATION APPARATUS FOR AN OPTICAL INFORMATION RECORDING AND REPRODUCING SYSTEM

Toshiaki Tsuyoshi, Kokubunji; Seiji Yonezawa; Masuo Kasai, both of Hachiouji, and Motoo Uno, Niihari, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 18, 1985, Ser. No. 692,575
Claims priority, application Japan, Jan. 20, 1984, 59-7123
Int. Cl.[4] G11B *7/00*
U.S. Cl. 369—46 **9 Claims**



1. An optical information recording and reproducing system comprising:

a recording medium;

at least one track on said recording medium along which a synchronization signal area and an information recording area are provided alternately, said synchronization signal area being provided with at least one pit preformed therein;

a means for irradiating a light beam onto said recording medium;

a means for deriving a tracking signal from said light beam modulated by the at least one pit preformed in said synchronization signal area while said light beam irradiates said synchronization signal area;

a means for holding said tracking signal to enable tracking when said light beam irradiates said information recording area;

a means for tracking by using said tracking signal from said holding means to control positioning of said light beam at least when said light beam irradiates said information recording area;

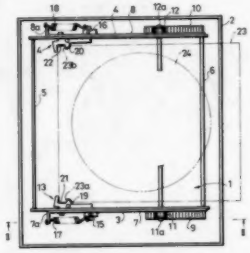
a means for recording an information signal in said information recording area by modulating said light beam irradiating said information recording area with an information signal; and

a means for compensation connected between said holding means and said tracking means for compensating an electrical phase delay caused by holding said tracking signal so as to enable accurate tracking when said light beam irradiates said information recording area.

4,710,910
SAFE LOADING-UNLOADING SYSTEM FOR TRAY IN COMPACT DISC PLAYER

Kazushige Ejiri, Iwaki, Japan, assignor to Alpine Electronics Inc., Japan

Filed Jul. 3, 1986, Ser. No. 881,848
Claims priority, application Japan, Jul. 13, 1985, 60-107367[U]
Int. Cl.[4] G11B *3/10, 17/04*
U.S. Cl. 369—75.2 **1 Claim**



1. A system for loading and unloading a tray carrying a compact disc into and from a compact disc player, wherein the compact disc player has a body with a front insertion part, and means for receiving the disc tray inserted in a longitudinal direction in said player body to an initial loading position and for moving the inserted tray to an operative loading position at which the disc can be separated from its tray and used for reproducing information recorded thereon, said system comprising:

a pair of side walls mounted in said player body spaced apart in the transverse direction so as to define a tray insertion path between them and each having a longitudinally extending first aperture formed therein;

a pair of slide plates each movable longitudinally along a respective one of said side walls and having a second aperture formed therein which is in registration with the first aperture of the respective side wall as the slide plate is moved longitudinally therealong;

a pair of pivotable lock arms each pivotably mounted through the second aperture of a respective one of said slide plates so as to be pivotable horizontally through the first aperture of the respective side wall at the initial loading position of the tray between an engaged position in which a free end of the lock arm is engaged in a corresponding groove in the leading edge of the tray and a disengaged position in which the free end of the lock arm is displaced from the groove in the tray;

biasing means for biasing each of said lock arms toward engagement of the free ends thereof into the grooves in the tray;

each of said lock arms having a lock pin formed thereon which abuts against a portion of the respective side wall when the respective slide plate is moved to the operative loading position of the tray, such that the lock arms are held in their engaged positions with the tray at the operative loading position in order to prevent disengagement of the tray from said lock arms and removal from the player body; and

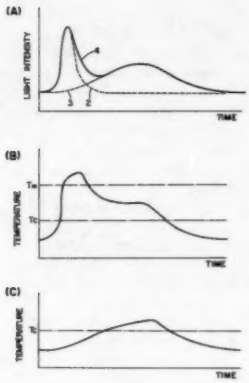
each of said first apertures of said side walls having a recess providing clearance for the lock pin of the respective lock arm at a position corresponding to the initial loading position of the tray, such that the lock arms are pivotable through the first apertures to their disengaged positions to allow insertion and removal of the tray into and from the player body at the initial loading position.

4,710,911

METHOD FOR RECORDING, REPRODUCING AND ERASING OPTICAL INFORMATION

Noboru Yamada; Michiyoshi Nagashima, both of Hirakata, and Kenichi Nishiuchi, Moriguchi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 19, 1985, Ser. No. 724,887
Claims priority, application Japan, Apr. 27, 1984, 59-86474
Int. Cl.[4] G11B 7/125
U.S. Cl. 369—100 14 Claims



1. An optical information recording/erasing method for irradiating light onto a state-changeable photosensitive recording film formed on a substrate so as to record erase information on said recording film, said recording film being made of a material whose optical properties vary in accordance with light irradiating conditions, said method comprising:

(a) initially irradiating an area on said recording film with said irradiating light with a sufficient power level to raise the temperature of said area of said film to above its melting point, thereby cancelling the recording history of said area on said film;

(b) allowing the temperature of said film at said area to cool to below its melting point;

(c) performing at least one of a recording and erasing operation after said area cools to below its melting point, said recording operation being performed by rapidly cooling said area on said film by at least one of (1) suddenly removing said irradiating light and (2) suddenly reducing the light power irradiating said area of said film, said erasing operation being performed by a slower cooling of said area on said film by a slower reduction in the light power irradiating said area of said film.

4,710,912

AIR CUSHION-OPTICAL DATA READ HEAD

Hugh W. Greene, P.O. Box 8, Somerville, Ala. 35670; James D. Holder, 707 Graycroft Dr., and James A. Knaur, 8003 Benavoya, Apt. M 101, both of Huntsville, Ala. 35802

Filed Jun. 2, 1986, Ser. No. 870,217
Int. Cl.[4] G11B 3/10
U.S. Cl. 369—218 4 Claims

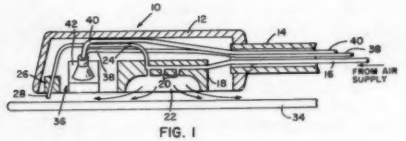


FIG. 1

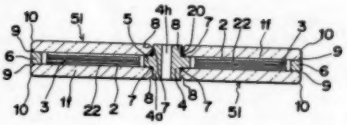
1. An air cushion-optical data read head comprising a housing structure with one side of said housing structure being adapted for facing a disc, said one side of said housing structure having a chamber defined thereat with an air supply means connected to said chamber, a capillary tube connected to said air supply means and being designed to inject air from said air supply means into a V-groove of a disc to guide said head to cause said head to track the V-groove of the disc, and an optical pick-up system mounted in said housing structure and including fiber-optic light guides with lens at one end of each of the light guides and being arranged for projecting light transmitted through said light guides onto opposite sides of the V-groove of the disc, said light being adapted to be reflected from opposite sides of the V-groove and back through said lens and said light guides for being filtered out and utilized as data for reproducing a recording on the disc.

4,710,913

OPTICAL RECORDING DISC

Seiichi Matsushima; Toshio Higashihara, both of Ibaragi; Mitsuru Shimizu, Toride; Ken Yoshizawa, Ibaragi; Masahiro Suzuki, Ibaragi, and Toshinori Sugiyama, Ibaragi, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jun. 24, 1986, Ser. No. 878,075
Claims priority, application Japan, Jun. 24, 1985, 60-135981
Int. Cl.[4] G01D 15/14
U.S. Cl. 369—280 10 Claims



1. An optical recording disc comprising:

a cylindrical hub having a center hole for insertion of a spindle of a recording and playback device,

a first disc unit comprising a first transparent disc substrate having a center hole in which said cylindrical hub is inserted and bonded, a resin layer formed on an inner surface of said transparent disc substrate and a recording layer formed on said resin layer, and

a disc member being one of a second disc unit comprising a second transparent disc substrate having a center hole in which said cylindrical hub is inserted and bonded, a resin layer formed on an inner surface of said second transparent disc substrate and a recording layer formed on said resin layer or a reinforcement disc comprising a reinforcement disc substrate bonded to said cylindrical hub,

said first transparent disc substrate including a first chamfer portion for receiving a bonding material for bonding said cylindrical hub and said first transparent disc substrate, said first chamfer portion being formed in a rim portion of an outside surface of said first transparent disc substrate at a boundary between said cylindrical hub and said transparent disc substrate,

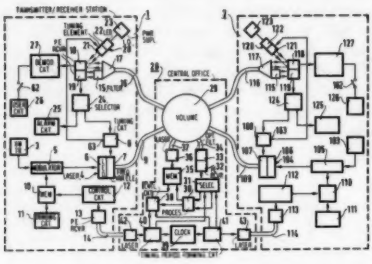
said second transparent disc substrate or reinforcement disc substrate of said disc member including a second chamfer portion for receiving a bonding material to bond said cylindrical hub and said transparent disc substrate or said reinforcement disc substrate, said second chamfer portion being formed in a rim portion of an outside surface of said second transparent disc substrate or said reinforcement disc substrate at a boundary portion between said cylindrical hub and said respective disc member.

4,710,914

OPTICAL FIBER TELECOMMUNICATION DEVICE

Jean Robieux, Chatenay Malabry, France, assignor to Compagnie General d'Electricite, Paris, France

Filed Aug. 22, 1986, Ser. No. 899,352
Claims priority, application France, Aug. 29, 1985, 85 12902
Int. Cl.[4] H04B 9/00; H04J 1/02
U.S. Cl. 370—3 9 Claims



1. Optical fiber telecommunication device adapted to provide communications between N users, comprising:

N stations assigned respectively to the N users, each station comprising:

a transmitter circuit adapted to transmit transmit electrical signals,

a semiconductor laser adapted to deliver a transmit optical wave,

a modulation circuit connected between the transmitter circuit and the laser to amplitude modulate the transmit optical wave by the transmit electrical signals,

a photo-electric receiver system adapted to deliver receive electrical signals when it receives a receive optical wave,

a circuit utilizing the receive electrical signals, and

a ringing circuit adapted to form electrical signals or ringing other stations, this ringing circuit being connected to the modulation circuit to provide for amplitude modulation of the transmit optical wave by the ringing signals,

N pairs of optical fibers respectively connected to the N user stations, each pair comprising a transmit optical fiber of which a first end is optically coupled to the output of the laser and a receive optical fiber of which a first end is coupled to the input of the receiver system, and

an interconnection volume filled with a material whose refractive index is similar to that of the material constituting the core of the optical fibers being connected to the surface delimiting this volume, in which device:

the semiconductor laser is of the tunable emission frequency type and comprises an element adapted to vary the frequency of the transmit optical wave by variation of an electrical current applied to this element, this current being supplied by a tuning circuit whose output is connected to said element, this current adjusting the frequency of the transmit optical wave to a first carrier frequency f_1 when the tuning circuit does not receive any signal,

the device comprises an interconnection central office comprising said interconnection volume, this central office further comprising:

a timing circuit comprising a clock adapted to send periodic timing signals representative of different timing periods assigned respectively to the N stations,

a means for transmitting signals indicative of these periods to the respective stations, each station comprising means for amplitude modulating the frequency f_1 of the transmit optical wave by the ringing signals only within the timing period assigned to each station, and

a processor whose input is connected to the interconnection volume in order to receive the ringing signals modulating the frequency f_1, these signals originating from the N stations, the processor designating for each call requested an optical frequency f_p available at the time of the call and selected from a predetermined sequence of frequencies, two consecutive frequencies being separated by a constant frequency interval, the output of the processor being connected to the interconnection volume to transmit the information of the designated frequency f_p, transmission being effected on a second optical carrier frequency f_2 in the timing periods assigned to the calling and called stations, and

the receiver system of each station comprises:

a first photo-electric sensor optically coupled to the first end of the receive optical fiber to receive the signals of frequency f_2 transmitted in the timing period reserved to the station, these signals being transmitted to said tuning circuit for adjusting the frequency of the laser to the designated frequency f_p,

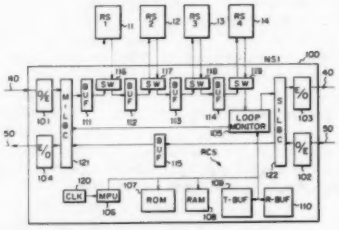
a heterodyne detector system comprising a second photo-electric sensor optically coupled to the first end of the receive optical fiber and a semiconductor local oscillator with a tunable emission optical frequency, the station comprising means for adjusting the frequency of the local oscillator to a frequency f_q near f_p, $f_q - f_p$ being small relative to said constant frequency interval between two consecutive frequencies from the predetermined list, the optical wave transmitted by the local oscillator illuminating the receive surface of the second sensor and the output of the heterodyne detector system being connected to a user circuit.

4,710,915

LOOP TRANSMISSION SYSTEM HAVING AUTOMATIC LOOP CONFIGURATION CONTROL MEANS

Takeshi Kitahara, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jul. 11, 1985, Ser. No. 753,960
Claims priority, application Japan, Jul. 13, 1984, 59-145702
Int. Cl.[4] H04J 3/14
U.S. Cl. 370—16 10 Claims



1. A loop transmission system, comprising:

a plurality of node means each having first and second data transmission paths; and

first and second loop transmission lines, operatively connected to said plurality of node means, transmitting data with a carrier signal in opposite directions, each of said lines forming, with each of said data transmission paths in said node means, a separate closed loop transmission line when in a normal mode;

each of said node means comprising:

first loop-back means, operatively connected to said first and second loop transmission lines and said first and second data transmission paths at one end in said node means, for monitoring the carrier signal received from said first loop transmission line, and connecting said first and second data transmission paths in said first loop-back means when the carrier signal from said first loop transmission line is lost;

second loop-back means, connected to said first and second loop transmission lines and said first and second data transmission paths at the other end in said node means, for monitoring the carrier signal received from said second loop transmission line, connecting said first and second data transmission paths in said second loop-back means when the carrier signal from said second loop transmission line is lost, and restoring said first and second loop transmission lines to the normal mode to maintain said separate closed loop transmission lines when the carrier from said second loop transmission line signal re-appears;

loop monitor means, connected to the first data transmission path, for monitoring the transmitted data, detecting an abnormal state in the transmitted data, and detecting a recovery from the abnormal state;

activating means for activating at least one of said first and second loop-back means to loop-back in response to the detection of the abnormal state; and

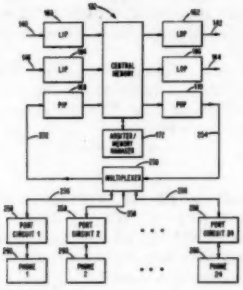
restoring means for restoring the at least one of said first and second loop-back means from the loop-back state in response to the detection of recovery from the abnormal state.

4,710,916

SWITCHING APPARATUS FOR BURST-SWITCHING COMMUNICATIONS SYSTEM

Stanford R. Amstutz, Andover; Mark Eliscu, Needham; Joseph M. Lenart, Arlington, and E. Fletcher Haselton, Waltham, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 2, 1985, Ser. No. 762,589
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—58 **6 Claims**



1. Time-division multiplexed switching apparatus for switching bursts of digitally encoded information received on link communication links to link communication links as designated by address information in the headers of the bursts, said time division multiplexed switching apparatus comprising:

a plurality of switching units each being connected to associated link communication links for receiving and transmitting digitally encoded information in frames of a set of time-division multiplexed link channels;

said plurality of switching units being arranged in a closed ring with hub bus means connecting each switching unit to the succeeding switching unit of the ring for transmitting digitally encoded information in frames of a set of time division multiplexed hub channels;

each switching unit having hub storage means for storing a byte of digitally encoded information;

hub circulating means for transferring a byte in the hub storage means of each switching unit to the hub storage means of the succeding switching unit at a rate to propagate a byte completely around the closed ring of switching units in a ring circulation period equal to the channel time of each hub channel, the transfer of bytes from each hub storage means to the hub storage means of the succeeding switching unit occurring during a tick period of a ring circulation period;

each switching unit including hub loading means for transferring a byte of a burst of digitally encoded information received on an associated link communication link to the hub storage means of the succeeding switching unit during a particular tick period of a ring circulation period as determined by the address information in the header of the burst; and

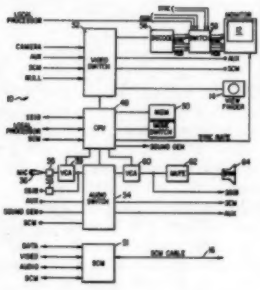
each switching unit including hub unloading means for transferring the byte in its hub storage means from the hub storage means during the tick period of a ring circulation period when the byte in the hub storage means is a byte of a burst of digitally encoded information having address information in the header designating the switching unit and the associated set of link channels for transmission of the byte on the associated link communication link and said switching apparatus having processing capacity sufficient to support an effective transmission rate of at least 1.544 million information-bearing bits per second on each of said link communication links coupled with said switching apparatus.

4,710,917

VIDEO CONFERENCING NETWORK

E. Neal Tompkins; Thomas C. Arends, and Michael W. Barry, all of San Antonio, Tex., assignors to Datapoint Corporation, San Antonio, Tex.

Filed Apr. 8, 1985, Ser. No. 721,281
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—62 **65 Claims**



1. A video conferencing network, comprising:

a plurality of video terminals each having a unique address for transmitting and receiving audio, video and data;

switching means for receiving audio and video information at one of a plurality of audio/video ports and selectively transmitting said received audio and video information to one or more of the remaining of said audio/video ports;

data manager means for receiving data at one of a plurality of data ports, determining which of the remaining of said data ports the received data is to be transmitted to in accordance with predetermined routing information and transmitting the received data to the determined one of said data ports;

communication link means disposed between each of said video terminals and a select one of said audio/video ports on said switching means and a select on of said data ports on said data manager means;

slave means for controlling the configuration of said switching means in response to receiving a reconfiguration signal from said data manager means, said slave means in data communication with a select one of said data ports on said data manager means;

network master means for cotnrolling the network, said

network master means receiving data from said data manager means and transmitting data thereto, said network master means communicating with said video terminals and said slave means, said network master means generating said reconfiguration signal for transmission to said slave means through said data manager means to reconfigure said switching means; and

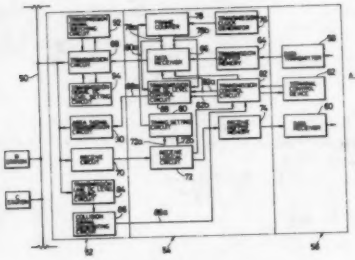
data link means for interfacing between said network master means and one of said data ports on said data manager means.

4,710,918

COMPOSITE DATA TRANSMISSION SYSTEM

Fumio Miyao, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Mar. 19, 1986, Ser. No. 841,543
Claims priority, application Japan, Mar. 20, 1985, 60-57166
Int. Cl.[4] H04J *3/24*
U.S. Cl. 370—85 **5 Claims**



1. A composite data transmission system wherein (i) packet switching stations adapted to transmit data of the kind for which transfer delay and periodicity do not matter and operated to detect collisions between packets in light of alterations in the DC voltage level of packet signals and (ii) circuit switching stations adapted to transmit data of the kind requiring periodic transmissions are connected to one and the same transmission line, which composite data transmission system is characterized by causing DC voltage signals of a fixed magnitude and prescribed periods to flow through said transmission line thereby enabling said packet switching stations to recognize collisions and permitting said circuit switching stations to exchange communication during the existence of said packet switching stations' recognition of collisions and permitting said packet switching stations to exchange communication during the absence of flow of said DC voltage signals.

4,710,919

MULTIPLEX SYSTEM FOR AUTOMATIC METER READING

Stewart W. Oliver, Venice, and John Cosgrove, Playa del Rey, both of Calif., assignors to International Teldata Corporation, Las Vegas, Nev.

Filed Oct. 21, 1983, Ser. No. 544,110
Int. Cl.[4] H04J *3/16*; G08B *23/00*
U.S. Cl. 370—96 **44 Claims**

1. A multiplexer system for receiving data from a plurality of interrogatable data transmitters coupled to a plurality of telephone lines connected to a telephone central office including line cutoff relays comprising:

a multiplexer means for coupling said multiplexer to the plurality of telephone lines beyond the line cutoff relays;

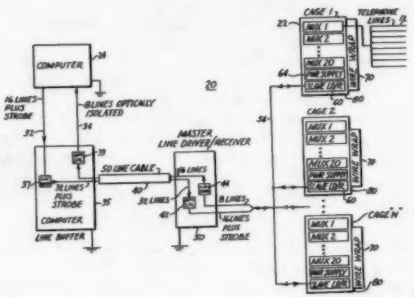
means for sending at least one distinct interrogation signal over each of the coupled telephone lines via said multiplexer;

means for receiving an alternating current representation of the data sent over the coupled telephone line from each of the plurality of interrogatable data transmitters via said multiplexer; and

means coupled to said multiplexer for converting each of the alternating current representations of the data into digital representations;

including means for demultiplexing the received alternating current representations from the plurality of coupled telephone lines to a single input circuit;

in which the alternating current representation from each of the interrogatable data transmitters is a series of pulses of a single audio tone, the pulses having at least two different pulse periods, and, the means for converting the alternating current representation into the digital representation comprises:



means for substantially filtering out all but the series of pulses of the single audio tone received at the single input line;

means for deriving a series of positive voltage pulses which are proportional in pulse period duration to the pulse period duration of the series of pulses of the single audio tone; and,

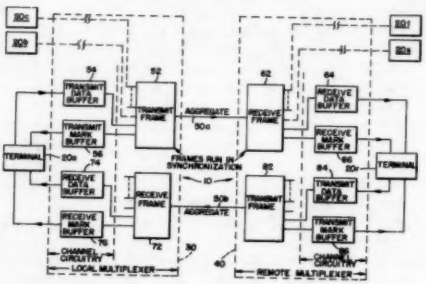
means for deriving a series of zero voltage transitions which are proportional in duration to the duration of the transition periods between the pulse periods of the series of pulses of the single audio tone.

4,710,920

BIT INTERLEAVED MULTIPLEXER SYSTEM PROVIDING BYTE SYNCHRONIZATION FOR COMMUNICATING APPARATUSES

David J. Manning, Waterbury, Conn., assignor to General DataComm, Inc., Middlebury, Conn.

Filed Jun. 19, 1986, Ser. No. 876,229
Int. Cl.[4] H04J *3/06*
U.S. Cl. 370—100 **22 Claims**



1. A bit interleaved multiplexer system which provides byte synchronization for apparatuses communicating on channels therein, comprising:

(a) a multiplexer having

(1) a transmit frame including at least one recirculating counter and a memory means, wherein said recirculating counters address the memory means, and the memory means is programmed according to a framing algorithm which frames at least data from said apparatuses and multiplexer framing synchronization information,

(2) a plurality of transmit data buffers for accumulating bits of information from their respective apparatuses, wherein a transmit data buffer sends a bit of information for transmission when said transmit frame selects a channel associated with said transmit data buffer according to said framing algorithm,

(3) a plurality of transmit mark buffers, wherein when said transmit frame selects a channel, a bit of information is written into the transmit mark buffer for the selected channel, the value of said bit having a first value when a predetermined bit of a byte as defined by said framing algorithm is selected according to said frame, and having a second value when a bit other than said predetermined bit of a byte as defined by said framing algorithm is selected, and wherein when a bit of information exits a transmit mark buffer, the terminal associated therewith sends a bit of information into its respective transmit data buffer, said bit being said predetermined bit of a byte when the exiting bit has said first value;

(b) a demultiplexer having

(1) a receive frame including at least one recirculating counter and a memory means, wherein the recirculating counters address the memory means, and the memory means is programmed according to a second framing algorithm which demultiplexes at least data and framing synchronization information received from said multiplexer, wherein said framing synchronization information is used to synchronize said transmit and receive frames of said multiplexer and demultiplexer,

(2) a plurality of receive data buffers for accumulating bits of information selected by said receive frame and sending them to their respective apparatuses,

(3) a plurality of receive mark buffers, wherein when a bit of information is written into the receive data buffer for an apparatus, an addition bit is written into said receive mark buffer, the value of said additional bit having a first value when said predetermined bit of a byte as defined by said second framing algorithm of said demultiplexer is indicated by said receive frame, and having a second value when a bit other than said predetermined bit as defined by receive frame is indicated, and wherein when a bit of information exits a receive mark buffer together with a bit exiting a receive data buffer, the apparatus associated therewith is informed as to whether said bit exiting said receive data buffer is said predetermined bit of the byte according to the value of the bit leaving said receive mark buffer; and

(c) at least one aggregate line connecting said multiplexer and demultiplexer over which multiplexed data and framing synchronization information is transmitted,

wherein the cumulative delay between the request of a particular bit by said transmit frame and the sending of the requested bit over said aggregate line equals $1(L)+C$ bits, where I is an integer greater than zero, L is the number of bits in a byte, and C is a constant which determines a phase shift between the synchronized transmit and receive frames.

4,710,921

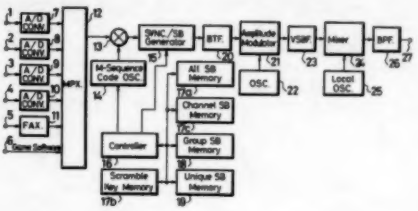
DIGITAL SIGNAL TRANSMITTING SYSTEM

Takanobu Ishidoh, and Yoshiyuki Kondoh, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 737,518, May 23, 1985, abandoned. This application Jul. 5, 1985, Ser. No. 751,871

Int. Cl.[4] H04J *3/12*

U.S. Cl. 370—110.1 **10 Claims**



1. A digital signal transmitting system comprising: a digital signal generator for producing digital information signals; a control signal generator for producing a frame synchronizing signal and service bit signal; time division-multiplexing means for producing a composite digital signal including said frame synchronizing signal, service bit signals and digital information signals, said service bit signals being arranged for continuously transmitting first and second control signals representing a terminal number and a scramble key code, respectively, in alternate frames of the composite digital signal; and means modulating said composite digital signal on a carrier for transmission thereby through a transmission line.

4,710,922

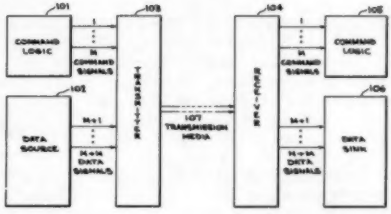
APPARATUS AND ASSOCIATED METHODS FOR CONVERTING SERIAL DATA PATTERN SIGNALS TRANSMITTED OR SUITABLE FOR TRANSMISSION OVER A HIGH SPEED SYNCHRONOUS SERIAL TRANSMISSION MEDIA, TO PARALLEL PATTERN OUTPUT SIGNALS

Paul H. Scott, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 18, 1985, Ser. No. 810,950

Int. Cl.[4] H04J *3/04;* **H03M** *00/00*

U.S. Cl. 370—112 **26 Claims**



1. Apparatus for converting serial data pattern signals, representative of asynchronous nonhomogeneous variable width parallel data pattern input signals and received over a synchronous serial transmission media, to parallel data pattern output signals which correspond to said input signals, including at least one receiver device wherein each such device comprises:

(a) means, including a first storage means, for capturing synchronously transmitted encoded data patterns from said media;

(b) second means, including data decoding means and demultiplexing means, for decoding and demultiplexing the input represented by a given captured data pattern and

generating the parallel data pattern output corresponding thereto; and

(c) third means, including parallel output means, for enabling the output of said parallel data pattern output signals.

4,710,923

CONTROL SYSTEM FOR DEINTERLEAVING MEMORIES IN DIGITAL AUDIO REPRODUCING APPARATUS

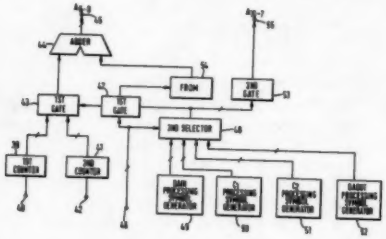
Masahide Nagumo, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 30, 1985, Ser. No. 792,890

Claims priority, application Japan, Oct. 31, 1984, 59-229234

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—2 **13 Claims**



1. A control system for deinterleaving memories in digital audio reproducing apparatus in which a plurality of cross-interleaved symbols are written into and read out from a RAM (Random Access Memory), said control system comprising:

a first processor for preparing at least one memory area with a predetermined storage capacity in said RAM,

a second processor for processing a first symbol in said plurality of cross-interleaved symbols to said memory area including a first counter which counts a first address for said processing of said first signal and

a third processor for processing a second symbol in said plurality of cross-interleaved symbols to said memory area including an adder which produces a sum of said count of said counter and a predetermined fix data as a second address for processing said second symbol.

4,710,924

LOCAL AND REMOTE BIT ERROR RATE MONITORING FOR EARLY WARNING OF FAULT LOCATION OF DIGITAL TRANSMISSION SYSTEM

Stanley Chum, Union City, Calif., assignor to GTE Sprint Communications Corp., Mountain View, Calif.

Filed Sep. 19, 1985, Ser. No. 777,802

Int. Cl.[4] H04L *1/00*; G06F *11/10*

U.S. Cl. 371—4 **14 Claims**

1. In a digital telecommunication system having at least two end terminals, apparatus for monitoring the BER (bit error rate) of the transmitted digital signals, which comprises:

means for periodically detecting the BER at each terminal in the system,

means for truncating the detected BER at each terminal such that at least the most significant digit and the exponent of said detected BER are included,

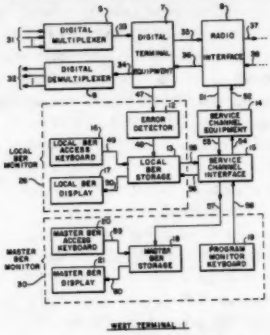
means for encoding said truncated BER for transmission to one of said terminals,

transmitting means at each terminal for transmitting said encoded truncated BER to said one terminal,

receiving means at said one terminal for receiving said transmitted encoded truncated BER,

means at said one terminal for decoding said encoded transmission to derive said truncated BER, and

first storage means at said one terminal for storing said truncated BER from each terminal and for providing an output that is representative thereof, and thereby providing



in-service line monitoring to detect marginal and failed transmission equipment.

4,710,925

DATA COMMUNICATION SYSTEM

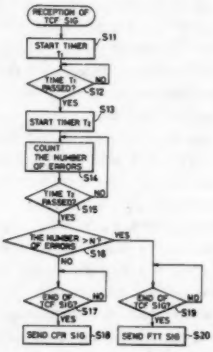
Tsuneo Negi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 7, 1984, Ser. No. 679,558

Claims priority, application Japan, Dec. 12, 1983, 58-232870

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—5 **8 Claims**



1. A data communication method comprising the steps of:

receiving a test signal for testing a transmission rate;

dividing a reception period of the test signal into a plurality of periods and detecting an error for each of the periods;

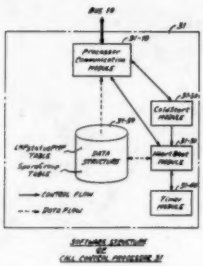
discriminating a failure of the reception of the test signal for each of the periods in accordance with a criterion which is set to become increasely difficult with the lapse of time; and

transmitting a signal representing the failure of the test signal reception to a test signal transmission party, in response to discrimination of the failure of the test signal reception in said discriminating step.

4,710,926
FAULT RECOVERY IN A DISTRIBUTED PROCESSING SYSTEM

Donald W. Brown, Naperville; James W. Leth, Warrenville, and James E. Vandendorpe, Naperville, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 27, 1985, Ser. No. 814,115
Int. Cl.[4] G06F *11/16*
U.S. Cl. 371—9 37 Claims



1. In an arrangement comprising a plurality of processors interconnected for message communication and each having a logical identity defining functions performed by that processor with respect to said arrangement, a fault recovery method comprising

each of said processors repeatedly broadcasting heartbeat messages to others of said processors, which heartbeat messages each define the logical identity of the processor broadcasting the heartbeat message,

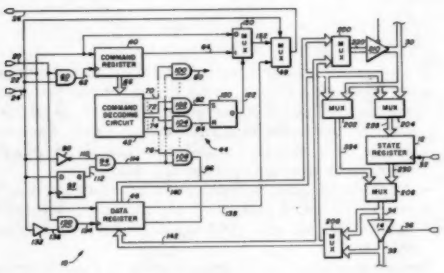
at least one of said processors maintaining an associated status table defining the logical identities of others of said processors based on heartbeat messages received therefrom and

said at least one of said processors, upon failing to receive heartbeat messages defining one of said logical identities defined in said status table, initiating performance of the functions defined by said one of said logical identities.

4,710,927
DIAGNOSTIC CIRCUIT

Michael J. Miller, San Jose, Calif., assignor to Integrated Device Technology, Inc., Santa Clara, Calif.

Filed Jul. 24, 1986, Ser. No. 888,701
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—15 8 Claims



1. A diagnostic circuit for receiving a serial diagnostic signal which includes in serial format both commands and data, a serial diagnostic signal clocking signal, and a command/data signal, the diagnostic circuit comprising in combination:

first coupling means;

a command register including a clock input coupled by said first coupling means to receive the serial diagnostic signal clocking signal, a serial data input coupled to receive the command portion of the serial diagnostic signal, a serial data output at which said command register develops a signal representing said command portion of said serial diagnostic signal delayed a predetermined number of cycles of said serial diagnostic signal clocking signal, and a predetermined number of parallel data outputs at which said command register develops a plurality of signals representing the command most recently received by said command register;

second coupling means;

a data register including a clock input coupled by said second coupling means to receive said serial diagnostic signal clocking signal, a serial data input coupled to receive the data portion of said serial diagnostic signal, a serial data output at which said data register develops a signal representing said data portion of said serial diagnostic signal delayed a predetermined number of cycles of said serial diagnostic signal clocking signal, a predetermined number of parallel data inputs for receiving a predetermined number of signals representing data in parallel format, and a predetermined number of parallel data outputs at which said data register develops a plurality of signals representing the data most recently received by said data register;

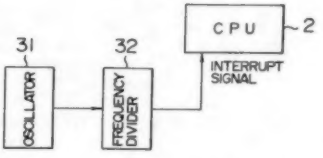
third coupling means; and

a multiplexer including a first data input coupled by said third coupling means to said command register serial data output to receive the command register developed serial diagnostic signal delayed command portion, a second data input coupled to said data register serial data output to receive the data register developed serial diagnostic signal delayed data portion, a control input coupled to receive the command/data signal, and a data output at which said multiplexer develops a delayed serial diagnostic signal.

4,710,928
METHOD AND APPARATUS FOR DETECTING THE UNCONTROLLABLE OPERATION OF A CONTROL SYSTEM

Akihisa Ueda, Niigata, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 797,894
Claims priority, application Japan, Nov. 16, 1984, 59-240433
Int. Cl.[4] G06F *11/32*
U.S. Cl. 371—16 9 Claims



1. An apparatus for detecting uncontrollable operation of a control system used for controlling a load, said apparatus comprising:

memory means for storing data relating to a given computational process;

central processing means for periodically executing the computational process based on the contents of said memory means and including means for setting a normality flag each time the execution of the computational process has been normally terminated;

output means for outputting an output signal based on the result of execution of the computational process, said output signal being applied to the load;

means for generating and applying to said central processing means an interrupt signal periodically at a predetermined time interval which is longer than a time interval required

for said central processing means to execute normally the computational process and then set the normality flag; and

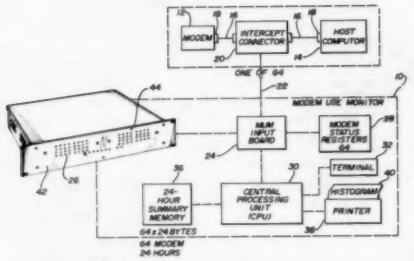
means provided to said central processing means for checking, in response to said interrupt signal, whether the normality flag is set and for resetting the normality flag, if the flag is set and executing an abnormality process if the normality flag is not set.

4,710,929

MODEM USE MONITOR

Robert J. Kelly, Old Tappan, and Tadhg Kelly, Randolph, both of N.J., assignors to Communication Devices, Inc., Clifton, N.J.

Filed Nov. 12, 1985, Ser. No. 797,166
Int. Cl.[4] H04M *3/08*; G06F *11/00*
U.S. Cl. 371—22 **28 Claims**



23. A device for analyzing modem defects among a plurality of modems formed into one or more groups thereof, each said group of modems sequentially serving a rotary hunt arrangement of telephone lines for data communications, said device further receiving data carrier detect detect signals from each said modem said device comprising:

central processing means for processing the data carrier detect signals from each modem and, in turn, being responsive to the presence and absence of said signals by providing responses on a periodic basis and by computing a modem utilization factor;

register means for storing said responses for each modem in numbered sequence;

said central processing means further for examining said register means upon acquisition of each said response and ascertaining if all modems lower in the numbered sequence have indication of data carrier detect present; and,

histogram-forming means for recording all responses from said register means for a given period showning data carrier detect present, data carrier detect absent, and modem answering out-of-sequence;

whereby modem defects such as a ring no answer condition and a lock-up condition are apparent upon examination of the histogram.

4,710,930

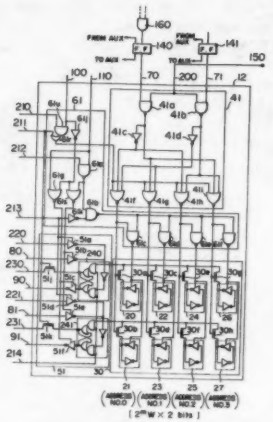
METHOD AND APPARATUS FOR DIAGNOSING A LSI CHIP

Kazumi Hatayama, and Terumine Hayashi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 3, 1986, Ser. No. 825,600
Claims priority, application Japan, Feb. 5, 1985, 60-20580
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—25 **9 Claims**

1. A method for diagnosing a LSI chip, having a random access memory with a plurality of addressable locations including at least one location for storing test data, functional logic circuits coupled to said random access memory, and a latch means coupled to each location of the random access memory which stores test data to be outputted for diagnosis including the diagnosis of said functional logic circuits, comprising, during diagnosis of a functional logic circuit by a scan-in/scan-out method, the steps:

storing an output signal from a functional logic circuit in one of said at least one storage location for storing test data;



reading out the stored output signal through the latch means; and

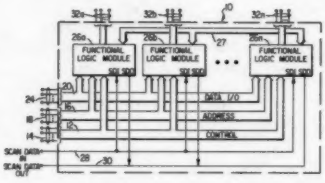
diagnosing whether a fault exists in said functional logic circuit being tested according to the data readout from the latch means.

4,710,931

PARTITIONED SCAN-TESTING SYSTEM

Jeffrey D. Bellay, Houston, and Theo J. Powell, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 23, 1985, Ser. No. 790,543
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—25 **17 Claims**



1. A method for test partitioning a logic circuit, comprising:

arranging the logic into modules with an operational mode and test mode, each of the modules having a plurality of control/observation locations disposed therein, the modules in the operational mode interacting in accordance with a predetermined operational format;

isolating the modules to define a test boundary about each module enclosing both the logic associated with each module and the control/observation locations disposed therein;

addressing a select one of the modules in the test mode for testing thereof;

applying test vectors in accordance with a predetermined test pattern for the select module to the control/observation locations in the select module to perform the test, the results of the test captured in the control/observation locations; and

observing the results captured in the control/observation

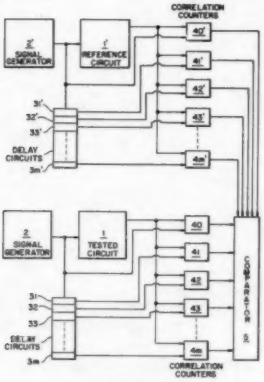
locations of the select module after the test vectors have been applied.

4,710,932

METHOD OF AND APPARATUS FOR FAULT DETECTION IN DIGITAL CIRCUITS BY COMPARISON OF TEST SIGNALS APPLIED TO A TEST CIRCUIT AND A FAULTLESS REFERENCE CIRCUIT

Kashiwagi Hiroshi, 4-711 Kurokami, Kumamoto-shi, Kumamoto-ken, Japan, assignor to Kashiwagi Hiroshi, Kumamoto, Japan

Filed Jan. 15, 1986, Ser. No. 819,225
Int. Cl.[4] G06F *11/00*
U.S. Cl. 371—25 5 Claims



1. An apparatus for fault detection in electronic circuits employing a correlation method, comprising:

first test circuitry including

a signal generator for supplying a circuit to be tested with a sequence of test signals,

at least one delay circuit connected to the output of said generator,

a plurality of correlation counters connected to the output of said generator, the output of said delay circuit and the output of said test circuit for counting correlation values between signals input to and output from said tested circuit,

a reference circuitry including

a second signal generator for supplying a reference faultless circuit with a sequence of test signals, the same number of delay circuits as in said test circuitry connected to the output of said second signal generator, the same number of correlation counters as in said test circuitry connected to the output of said second signal generator and each of the outputs of said delay circuits, and an output of said reference circuit for counting correlation values between the signals input to and output from said reference circuitry, and

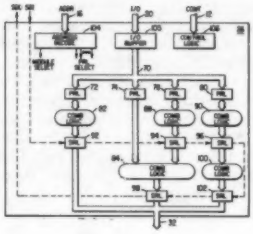
a comparator connected to outputs of said counters of both said test and reference circuitries for comparing the correlation values output therefrom.

4,710,933

PARALLEL/SERIAL SCAN SYSTEM FOR TESTING LOGIC CIRCUITS

Theo J. Powell, Dallas; Jeffrey D. Bellay; Martin D. Daniels, both of Houston, and Yin-Chao Hwang, Sugar Land, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 23, 1985, Ser. No. 790,569
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—25 15 Claims



1. A testable logic module, comprising:

an internal parallel data bus;

a logic circuit operable to provide a predeptermined logic function in an operating mode, said logic circuit having a plurality of control/observation locations therein;

a first parallel register, comprising:

a plurality of parallel register latches for storing data, each parallel register latch connected to a control/observation location in said logic circuit for presenting data thereto and receiving data therefrom; and

means for connecting each said parallel register latch to said internal parallel data bus to communicate data therebetween responsive to a read/write signal;

a serial register comprising:

a serial register input;

a serial register output; and

a plurality of serial register latches, said serial register latches being configured in a serial chain for serial shifting of data therethrough from said serial register input to said serial register output responsive to a clock signal, and each of said serial register latches being connected to a control/observation location in said logic circuit for presenting data thereto and receiving data therefrom; and

control logic, connected to said parallel register and to said serial register, for generating said read/write signal to said connecting means in said parallel register responsive to an external register read/write signal, and for generating said clock signal to said serial register responsive to an external test scan signal.

4,710,934

RANDOM ACCESS MEMORY WITH ERROR CORRECTION CAPABILITY

Kevin Traynor, Albuquerque, N. Mex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 8, 1985, Ser. No. 796,367
Int. Cl.[4] G11C *29/00*; G06F *11/10*
U.S. Cl. 371—38 12 Claims

1. A read/write memory, comprising:

a plurality of data memory cells arranged in rows and columns;

a plurality of code memory cells arranged in rows and columns; each row of said code memory cells for storing an error detection code corresponding to a row of said data memory cells;

row addressing means for selecting a row of said data mem-

ory cells and the corresponding row of said code memory cells;

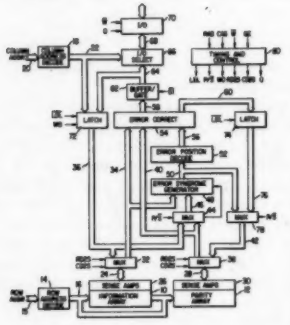
sensing means for sensing the contents of each data memory cell and each said code memory cell in the row selected by said row addressing means and for writing the contents of said data memory cells and said code memory cells in the selected row;

error detection logic, connected to said sensing means, for detecting an error in the sensed contents of said data memory cells and the contents of the associated code memory cells by way of a predetermined code;

error correction logic, connected to said error detection logic and to said sensing means, for modifying the sensed output for a data memory cell corresponding to an error detected by said error detection logic;

column addressing means for selecting a data memory cell to be read or written responsive to a column address signal;

input/output means, connected to said column addressing means, for externally presenting the modified contents of the selected data memory cell in a read cycle, and for receiving data to be written to the selected data memory cell in a write cycle;



read/write logic, for controlling said input/output means to present data responsive to a read signal, and for controlling said input/output means to receive data in a write cycle;

a data latch having a bit position for each data memory cell in a row, connected to the output of said error correction logic, for storing the output of said error correction logic, and connected to said input/output means and said read/write logic so that, in a write cycle, the bit position corresponding to the data memory cell selected by said column addressing means therewithin is rewritten with the data received by said input/output means;

a data rewrite bus, connected to said data latch and to said sensing means, for communicating the contents of said data latch to said sensing means for application to the data memory cells in the selected row; and

code generation means, connected to said data rewrite bus and to said sensing means, for generating the contents of the code memory cells for the selected row, based upon the contents of said data latch, for application to the code memory cells in the selected row.

4,710,935

PARITY DETECTION SYSTEM FOR WIDE BUS CIRCUITRY

Dongsung R. Kim, Laguna Hills, and Reinhard K. Kronies, Fountain Valley, both of Calif., assignors to Unisys Corporation, Detroit, Mich.

Filed Apr. 4, 1986, Ser. No. 848,073
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—49 **12 Claims**

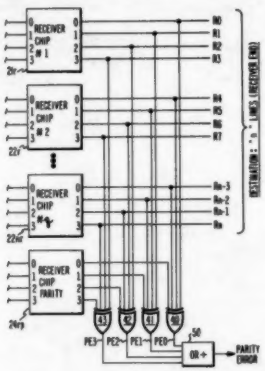
1. A data transfer system for checking reliability of data transfers from a Source means to Destination means and where a trasnfer bus has "n" data bit lines organized in groups of "k" lines and each group of "k" lines is serviced by a multiple driver chip and a corresponding multiple receiver chip, the system comprising:

(a) said data transfer bus having n data-bit lines for transferring data from said Source means to said Destination means;

(b) a plurality of "q" driver chips, connected to receive data from said Source means, where q =n/k and wherein k represents a number of data transfer lines in a group where "k" is a submultiple of "n";

(c) a plurality of "q" receiver chips each of which is connected to receive "k" data bit lines from each of a corelated driver chip for subsequent transfer to said Destination means;

(d) first sense means, connected to said Source means; for sensing each of said data bits on each corresponding input line on each of said "q" driver chips to provide a first set of "k" resultant-parity bits to a parity driver chip;



(e) parity chip means including:

(e1) said parity driver chip for receiving said first set of "k" resultant parity bits and transferring them to a parity receiver chip;

(e2) said parity receiver chip connected to transmit said first set of "k" resultant parity bits to a second sense means;

(f) second sense means, connected to said Destination means and receiving said first set of "k" resultant partiy bits, and for sensing each of said data bits on each corresponding output line of said "q" receiver chips to provide a second set of "k" resultant-parity bits which result from compasring said receiver chips output line data bits with said first set of "k" resultant parity bits;

(g) third sense means for receiving said second set of "k" resultant-parity bits to generate an error flag signal when a data transmission error has occurred.

4,710,936

OPTOELECTRONIC SEMICONDUCTOR DEVICE

Jun Shibata, Sakai, and Hiroyuki Serizawa, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 12, 1985, Ser. No. 722,586
Claims priority, application Japan, Apr. 12, 1984, 59-73380
Int. Cl.[4] H01S *3/19*
U.S. Cl. 372—45 **11 Claims**

1. In an optoelectronic semiconductor device, the improvement comprising:

a bipolar transistor including,

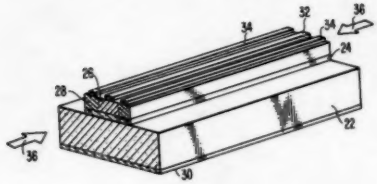
a collector layer of a first type of conductivity;

a base layer of a second type of conductivity disposed on said collector layer, and

an emitter layer of said first type of conductivity disposed on said base layer;

current supplying layers disposed on both sides of said base layer and composed of a semiconductor material of said second type of conductivity, said current supplying layers being electrically coupled to said base layer for supplying current thereto; and

base electrodes respectively disposed on said current supplying layers;



said base layer being composed of a direct transition type semiconductor and having a band gap energy which is lower than the band gap energy of both said emitter and collector layers and having a refractive index which is higher than the refractive index of both said emitter and collector layers;

wherein said base layer emits light when said current is supplied to said base layer through at least one of said base electrodes.

4,710,937

LASER SYSTEM

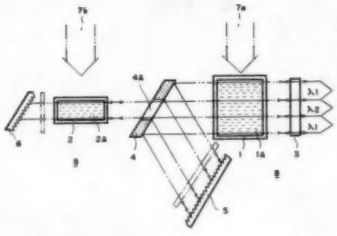
Tatsuo Oomori; Kouichi Ono, and Shigeto Fujita, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1986, Ser. No. 851,219

Claims priority, application Japan, Jun. 13, 1985, 60-127249; Jun. 13, 1985, 60-127250

Int. Cl.[4] H01S *3/20*

U.S. Cl. 372—53 **29 Claims**



1. A laser system comprising:

a plurality of dye vessels which are disposed in series at predetermined intervals and each of which contains a lasing dye and a solvent for the dye, said dyes generating light waves of different laser oscillation wavelengths when subjected to pumping;

a translucent output mirror means disposed on one side of said dye vessels and used for both laser transmission and oscillation;

reflecting mirror means disposed inclinedly between said dye vessels, said reflecting mirror means having a window formed centrally thereof;

a first wavelength selecting means positioned so that a specific wavelength portion of a beam reflected by said reflecting mirror means is reflected selectively at a high reflectance toward said reflecting mirror means;

a second wavelength selecting means disposed on an opposite side of said dye vessels and functioning to reflect a specific wavelength portion of a beam passing through the window of said reflecting mirror means, selectively at a high reflectance toward said output mirror means; and

pumping means positioned so that a pumping light is directed toward each of said lasing dyes.

4,710,938

METAL ION LASER PROTECTED AGAINST THE DEPOSITION OF METAL VAPOR ON BREWSTER WINDOWS

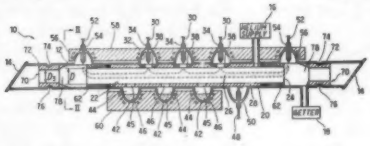
Akira Fuke; Yasuhiro Tokita, and Katsuhiko Masuda, all of Shizuoka, Japan, assignors to Koito Seisakusho Co., Ltd., Tokyo, Japan

Filed Jun. 6, 1986, Ser. No. 873,155

Claims priority, application Japan, Jun. 7, 1985, 60-122821; Jun. 7, 1985, 60-122822

Int. Cl.[4] H01S *3/22*

U.S. Cl. 372—56 **11 Claims**



1. A metal ion laser for generating a laser beam by utilizing negative glow discharge, comprising:

(a) a substantially tubular, hermetically sealed housing of an electrically nonconducting material having a pair of Brewster windows at its opposite ends;

(b) a hollow cathode mounted within the housing and having opposite ends disposed at a distance from the Brewster windows;

(c) primary anode means disposed intermediate the opposite ends of the hollow cathode and open to the interior thereof;

(d) metal chamber means for containing a metal material to be vaporized, the metal chamber means being disposed intermediate the opposite ends of the hollow cathode and open to the interior thereof;

(e) a pair of secondary anodes disposed adjacent the opposite ends of the hollow cathode for protecting the Brewster windows from contamination by the metal vapor by sending the metal vapor back into the hollow cathode;

(f) a pair of tubular insulators disposed respectively between the opposite ends of the hollow cathode and the secondary anodes and in coaxial relation to the hollow cathode, so that the metal vapor is sent back by the secondary anodes into the hollow cathode through the tubular insulators;

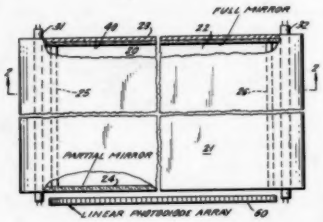
(g) each tubular insulator having an axial bore including a smaller diameter portion and a larger diameter portion, the smaller diameter portion of the bore being disposed away from the hollow cathode and having a diameter approximately equal to the inside diameter of the hollow cathode, the larger diameter portion of the bore being disposed closer to the hollow cathode and having a diameter greater than that of the smaller diameter portion; and

(h) a pair of constriction means disposed respectively adjacent the Brewster windows for reducing the inside diameter of the housing and hence for impeding the travel of the metal vapor from the hollow cathode toward the Brewster windows.

4,710,939
X-RAY FREQUENCY DOWN CONVERTER

Curtis Birnbach, Bronx, and Jay Tanner, Nesconset, both of N.Y., assignors to Quantum Diagnostics Ltd., Hauppauge, N.Y.

Continuation of Ser. No. 518,689, Jul. 23, 1983, abandoned. This application Feb. 3, 1987, Ser. No. 14,076
Int. Cl.[4] H01S *3/00, 3/05*
U.S. Cl. 372—73 20 Claims

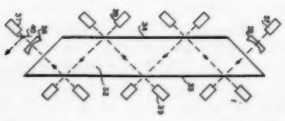


1. An X-ray detector comprising an excimer laser consisting of a cavity filled with a mixture of a noble gas and a halogen gas; said cavity having first and second parallel spaced walls which have a respective fully reflecting and partially refecting member fixed thereto; laser pumping means coupled to said cavity for pre-exciting said excimer gas within said cavity to a level first below its lasing energy level, whereby an input X-ray photon of given energy will induce local coherent light generation of a corresponding intensity within said cavity and exteriorly thereof through said partially reflecting member; an input source of X-ray photons fixed relative to said cavity and separate from said pumping means; and an output detector for detecting coherent light generated by said input source of X-ray photons.

4,710,940
METHOD AND APPARATUS FOR EFFICIENT OPERATION OF OPTICALLY PUMPED LASER

Donald L. Sipes, Jr., Los Angeles, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Oct. 1, 1985, Ser. No. 782,711
Int. Cl.[4] H01S *3/093*
U.S. Cl. 372—75 9 Claims

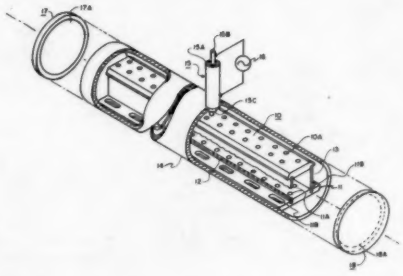


1. An optically pumped laser comprising an optical resonator cavity, a laser medium in said resonator cavity, said laser medium having an optical axis and two ends, one end at each of two opposite sides of said medium intersected by said optical axis, an array of laser diodes positioned for pumping said laser medium in the direction of the axis of said resonator cavity, and means for causing the pump distribution from said array of laser diodes to be concentrated inside the lasing mode volume of said medium.

4,710,941
PERFORATED ELECTRODES FOR EFFICIENT GAS TRANSFER IN CW CO_2 WAVEGUIDE LASERS

Elmer C. Sluss; John E. Nettleton, and Dallas N. Barr, all of Prince William County, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 26, 1986, Ser. No. 935,360
Int. Cl.[4] H01S *3/02, 3/22*
U.S. Cl. 372—87 5 Claims



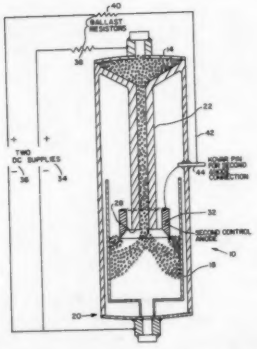
1. In a gas laser having a large closed container filled with a gaseous lasing medium and a smaller waveguide mounted in said medium with dielectric sidewalls and isolated elongated metal top and bottom electrodes joining said sidewalls, said electrodes having broad parallel opposing faces to couple to a radio frequency source and propagate radio frequency energy; the improvement comprising:

a plurality of inner conduits formed through said electrodes normal to the said broad faces of said electrodes, whereby said gaseous medium when heated can flow transversely out of said waveguide through said top electrode and into said waveguide through said bottom electrode.

4,710,942
VARIABLE POWER GAS LASER TUBE

P. Guy Howard, Junction City, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Feb. 27, 1986, Ser. No. 834,289
Int. Cl.[4] H01S *3/097*
U.S. Cl. 372—87 8 Claims



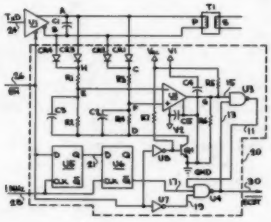
1. In a gas laser having a plasma tube, a cathode at a cathode end, an anode at an anode end and two mirror assemblies, an improved construction for enabling power output to be controlled dependably by controlling current level in the laser, without flickering of said laser at low current levels as would otherwise occur, comprising second anode means in the vicinity of the cathode positioned within the cathode end of the

plasma tube, for assuring a consistently adequate supply of electrons in the vicinity of the cathode even at low current levels, so that laser output flicker due to electron starvation is avoided.

4,710,943
STARLAN CODED DATA TRANSCEIVER COLLISION DETECTION CIRCUIT

Raymond S. Duley, Buda, and Leslie Forth, Manchaca, both of Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Dec. 12, 1986, Ser. No. 941,238
Int. Cl.[4] H04B *1/40*
U.S. Cl. 375—7 **20 Claims**



1. A daisy chain collision detection circuit for use with a StarLAN coded data transceiver, comprising:

a voltage comparator having an inverting input, a non-inverting input and an output;

first and second input nodes for receiving differential output voltages from a differential line driver and transient spike voltages from the primary of an isolation transformer;

first rectifier means being connected between said first input node and a first intermediate node;

second rectifier means being connected between said second input node and said first intermediate node;

a first voltage divider formed of a series connection of a first resistor and a second resistor, said first voltage divider being coupled between said input nodes and a second intermediate node, the junction of said first resistor and said second resistor being connected to the inverting input of said voltage comparator;

a second voltage divider formed of a series connection of a third resistor and a fourth resistor, said second voltage divider being connected between said first intermediate node and said second intermediate node, the junction of said third resistor and said fourth resistor being connected to the non-inverting input of said voltage comparator; and

a first charging capacitor being connected between the non-inverting input of said voltage comparator and said second intermediate node, said first charging capacitor being charged to a voltage which is directly proportional to the peak voltage of said differential output voltages.

4,710,944
DUAL TRANSMIT-RECEIVE SPACE DIVERSITY COMMUNICATION SYSTEM

Edward J. Nossen, Camden County, Cherry Hill Township, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Oct. 17, 1986, Ser. No. 920,218
Int. Cl.[4] H04L *1/06*; H04B *7/04*
U.S. Cl. 375—40 **11 Claims**

1. A space-diversity communication system, comprising:

first and second spaced-apart antennas located at a first site and aimed towards third and fourth spaced-apart antennas located at a second site remote from said first site;

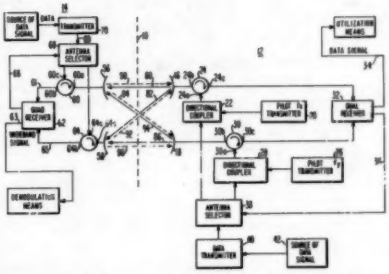
first transmitting means located at said first site, said first transmitting means being coupled to said first antenna for causing said first antenna to transmit a relatively narrow-band first transmission signal at a first frequency towards said third and fourth antennas;

second transmitting means located at said first site, said second transmitting means being coupled to said second antenna for causing said second antenna to transmit a relatively narrowband second transmission signal at a second frequency towards said third and fourth antennas;

first and second receivers located at said second site, said first and second receivers being coupled to said third and fourth antennas, respectively, and tuned to said first frequency for receiving said first transmission signal arriving at said third and fourth antennas by different paths, and for generating first and second control signals, respectively, in response to the amplitudes of said first transmission signal as received;

third and fourth receivers located at said second site, said third and fourth receivers being coupled to said third and fourth antennas, respectively, and tuned to said second frequency for receiving said second transmission signal arriving at said third and fourth antennas by different paths, and for generating third and fourth control signals, respectively, in response to the amplitudes of said second transmission signal as received;

first logic means coupled to said first, second, third and fourth receivers, and responsive to said first, second, third and fourth control signals for determining which of said third and fourth antennas is a part of the lowest-loss signal path between said first and second sites, and for generating a first selection control signal in response thereto;



first data transmission means located at said second site, said first data transmission means generating a first data transmission signal including first data for transmission to said first site;

first controllable coupling means located at said second site, and coupled to said first data transmission means, said first logic means and to said third and fourth antennas for selectively coupling said first data transmission signal to one of said third and fourth antennas in response to said first selection control signal, whereby said first data transmission signal is received by different paths, one of which is said lowest-loss signal path, at said first and second antennas;

fifth and sixth receivers located at said first site, said fifth and sixth receivers being coupled to said first data transmission signal by said different paths, and for generating fifth and sixth control signals, respectively, in response to the amplitude of said first data transmission signal as received;

second logic means coupled to said fifth and sixth receivers for receiving said fifth and sixth control signals therefrom, for determining which of said first and second antennas is a part of said lowest-loss signal path between said first and second sites, and for generating a second selection control signal in response thereto;

second controllable coupling means located at said first site, and coupled to said second logic means and adapted to be coupled to utilization means for selecting for use by said

utilization means said first data transmission signal received by that one of said first and second antennas which is a part of said lowest-loss signal path;

second data transmission means located at said first site and coupled to at least one of said first and second antennas for transmitting said second data by way of said at least one of said first and second antennas; and

demodulation means located at said second site, said demodulation means being coupled to said first controllable coupling means for receiving said second data by way of that one of said third and fourth antennas which is part of said lowest-loss signal path.

4,710,945

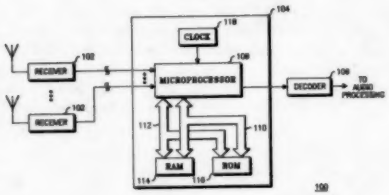
SIGNAL SELECTION BY STATISTICAL COMPARISON

Paul M. Bocci, Roselle; Carl M. Pietrzak, Jr., Schaumburg, and Alan L. Wilson, Hoffman Estates, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 30, 1986, Ser. No. 858,462

Int. Cl.[4] H04B *7/08*

U.S. Cl. 375—100 **16 Claims**



1. A method for selecting an optimum digital signal from a plurality of received digital signals, comprising the steps of:

(a) storing the plurality of received signals to provide a plurality of stored signals;

(b) parsing, respectively, each of said plurality of stored signals to provide a plurality of segments;

(c) determining the number of occurrences of each of a plurality of predetermined bit patterns within said segments to provide a respective tally thereof;

(d) computing the difference between each of said tallied occurrences to a predetermined expected value of occurrences to provide a plurality of difference values;

(e) summing said plurality of difference values to provide a respective quality signal for each of the received digital signals;

(f) selecting the optimum one of the plurality of received digital signals in response to said respective quality signals.

4,710,946

METHOD AND APPARATUS FOR X-RAY VIDEO FLUOROSCOPIC ANALYSIS OF ROCK SAMPLES

Henry H. Hinch, Tulsa; Gail E. Boyne, Sapulpa; David L. Daniels, Haskell, and Eugene V. Kullmann, Tulsa, all of Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Aug. 6, 1985, Ser. No. 763,100

Int. Cl.[4] G01N *23/08, 23/18;* G01V *9/00*

U.S. Cl. 378—62 **11 Claims**

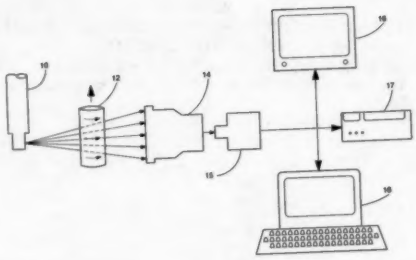
1. A method for nondestructive analysis of rock samples using an X-ray video fluoroscope comprising the steps of:

placing a rock sample which has at least one X-ray determinable internal feature in the direction of its major axis in an analysis zone of an X-ray video fluoroscope;

directing an X-ray beam generated by said X-ray video fluoroscope through said rock sample;

moving said rock sample in said analysis zone by both moving said rock sample through said analysis zone and simultaneously, continuously rotating said rock sample within said analysis zone around its major axis;

generating a two-dimensional X-ray image of said internal feature of said rock sample;



converting said two-dimensional X-ray image into a two-dimensional light image of said internal feature; and

televising said two-dimensional light image and displaying it on a video monitor such that said internal feature may be seen as it moves through said analysis zone while rotating.

4,710,947

COLLIMATOR FOR A RADIATION DIAGNOSTICS APPARATUS

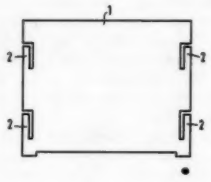
Sigismund Klein, Nuremberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 28, 1986, Ser. No. 890,112

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534893

Int. Cl.[4] G21K *1/02*

U.S. Cl. 378—147 **3 Claims**



1. An X-ray collimator comprising an X-ray opaque collimator plate and spaced parallel carriers, said carriers having slots to receive said plate; said collimator plate having resilient tongues at respective edges thereof which are received in said slots, said tongues projecting beyond a thickness of a collimator plate and when received in said slots said tongues pressing against an inside surface of the respective slots and pressing the collimator plates against another inside surface of said slots opposite thereto.

4,710,948

GEOLOGIC CORE HOLDER WITH COMPOSITE BARREL

Eric M. Withjack, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 13, 1985, Ser. No. 808,766

Int. Cl.[4] H05G *1/00*

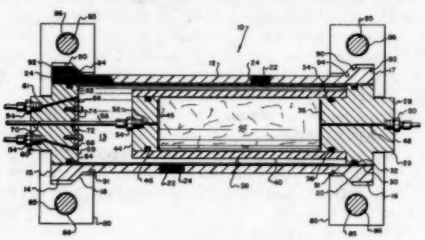
U.S. Cl. 378—208 **9 Claims**

1. A core holder for testing geologic core samples including x-ray imaging of said core samples under various test conditions comprising:

an elongated cylindrical barrel adapted to provide minimal attenuation of x-rays when subjected to x-radiation, said

barrel comprising a composite of wound non-metallic filaments embedded in a thermoset polymer resin matrix and said barrel including opposed ends;

opposed removeable end plugs insertable in a bore formed by said barrel and defining a cavity for receiving a geo-



logic core sample, one of said plugs including means for supporting said core sample within said bore; and

plug retaining means engageable with said barrel at opposite ends thereof for retaining said plugs in said bore, respectively.

4,710,949

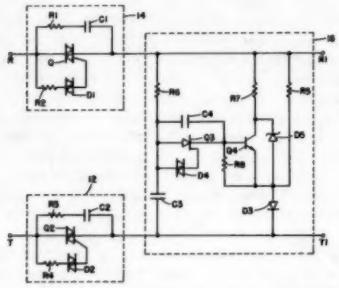
TELEPHONE LINE FAULT LOCATING DEVICE

Om Ahuja, Houston, Tex., assignor to Om Electronics Systems Corp., Houston, Tex.

Continuation of Ser. No. 753,719, Jul. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 633,107, Jul. 20, 1984, abandoned. This application Feb. 11, 1987, Ser. No. 13,141

Int. Cl.[4] H04B *3/46*

U.S. Cl. 379—26 **51 Claims**



1. A fault locating device for connection within the tip and ring conductors of a customer's telephone line for determining whether a fault exists on the central office side or on the customer side of said fault locating device, said fault locating device comprising;

a first voltage and current sensitive bilateral switching device connected in series with said tip conductor;

a second voltage and current sensitive bilateral switching device connected in series with said ring conductor;

each of said bilateral switching devices including a solid state silicone bilateral switch responsive to a predetermined threshold voltage to avalanche said switch and initiate conduction and responsive to a predetermined current flow therethrough to sustain conduction, said switch being responsive to pass both AC and DC voltages and currents normally encountered on said telephone line when said voltage exceeds said predetermined threshold level; and

a distinctive termination circuit connected across said tip and ring line on the customer side of said fault locating device, said circuit including a blocking means for allowing current flow only in the direction from the ring line to the tip line.

4,710,950

AUTOMATIC TELEPHONE ANSWERING APPARATUS WITH RECORDED CUE SIGNALS SEPARATING EACH INCOMING MESSAGE

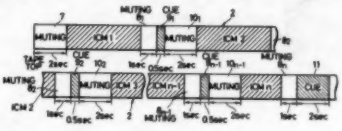
Tadashi Yamamoto, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 19, 1986, Ser. No. 897,920

Claims priority, application Japan, Aug. 31, 1985, 60-192454

Int. Cl.[4] H04M *1/65*

U.S. Cl. 379—70 **9 Claims**



1. Automatic telephone answering apparatus comprising:

a first recording medium for recording an outgoing message to be sent to a calling party in response to a call from the calling party;

a second recording medium for sequentially recording incoming messages from calling parties along a given direction of said second recording medium after the outgoing message is sent to respective ones of the calling parties;

recording means for recording on said second recording medium a first muting portion having a predetermined duration after a first incoming message from a calling party is recorded on said second recording medium and for recording on said second recording medium after said first muting portion a first control signal having a predetermined duration;

means for moving said second recording medium after the first control signal is recorded to a location such that an intermediate portion of said first control signal is opposed to said recording means;

means for setting an incoming call standby mode enabling the reproduction and sending of the outgoing message in response to an incoming call from a new calling party while the second recording medium is fixed in position; and

means for reproducing and sending the outgoing message in response to said incoming call from said new calling party in the incoming call standby mode and moving said second recording medium forward, said recording means recording on said second recording medium a second muting portion having a predetermined duration, so that said first control signal is modified to form a second control signal having a duration shorter than that of said first control signal and lying between said first muting portion and said second muting portion and said recording means is positioned to record said second incoming message from said new calling party on said second recording medium after said second muting portion.

4,710,951

FACSIMILE SYSTEM

Toshiyuki Itezono, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jun. 24, 1985, Ser. No. 748,044

Claims priority, application Japan, Jun. 25, 1984, 59-129276

Int. Cl.[4] H04N *1/32*

U.S. Cl. 379—100 **1 Claim**

1. A facsimile system comprising:

(a) a network control unit for controlling an exchange network;

(b) an input means for inputting transmission command

information, dialing number and address information for an abbreviated dialing number;

(c) a memory means for storing a plurality of full dialing numbers at predetermined addresses which each correspond to a plurality of abbreviated dialing numbers;

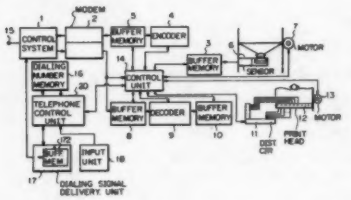
(d) a buffer memory for temporarily storing a telephone number to be transmitted, said telephone number being read out from said memory means upon a designation of an address corresponding to a specified abbreviated dialing number;

(e) a delivery means for delivering a dialing number stored in said buffer memory to a telephone circuit via said network control unit;

(f) a modem for modulating data suitable for transmission over a telephone circuit and for demodulating data received from said telephone circuit;

(g) a means for reading original sheets;

(h) a means for printing the received data;



(i) a first control means for controlling a facsimile communication operation of said facsimile system and a reading operation of said reading means and a printing operation of said printing means, and for detecting an end of a facsimile reception and for outputting an end-detection signal thereafter; and

(j) a second control means for controlling said memory means and buffer memory, and for controlling said delivery means so as to deliver a dialing number stored in said buffer memory to said telephone circuit immediately during an idle state of the system, or after receiving said end-detection signal from said first control means after a facsimile reception;

wherein when address information for said abbreviated dialing number and said transmission command information are received during a facsimile reception, said second control means controls said delivery means so as to deliver the full dialing number stored in said buffer memory to said telephone circuit in response to said end-detection signal from said first control means.

4,710,952

DISTRIBUTED CONTROL TYPE ELECTRONIC SWITCHING SYSTEM

Tsuneo Kobayashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 13, 1986, Ser. No. 829,039

Claims priority, application Japan, Feb. 13, 1985, 60-25950; Aug. 8, 1985, 60-174859

Int. Cl.[4] H04M *3/08;* **H04Q** *3/56, 11/04*

U.S. Cl. 379—269 **7 Claims**

7. A distributed control type electronic switching system, comprising:

a plurality of speech-path switches respectively provided with duplicated first and second speech-path switching means operable simultaneously; line and trunk circuits associated with each of said speech-path switches;

a distributed first plurality of processors respectively provided with duplicated first and second processing means connected to said first and second speech-path switching means of each of said speech-path switches and to said line and trunk circuits associated with said corresponding speech-path switch, said first and second processing means being complementarily arranged in active and standby operation states;

means for reciprocally switching said active and standby operation states of said first and second processing means;

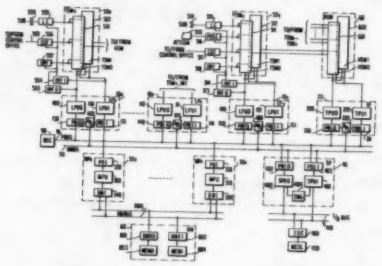
first and second interface means respectively connected to said first and second processing means;

a distributed second plurality of processors respectively provided with single processing means and single interface means for controlling various connections of said speech-path switches and said line circuits and said trunk circuits; and

transfer means connecting at least said first and second interface means of each of said first plurality of processors and said single interface means of each of said second plurality of processors, for transmitting information and data between said first and said second plurality of processors;

each of said interface means of said first and said second plurality of processors comprising:

first storage means for storing processor-number-data for the processor associated with said interface means; second storage means for storing operation-state-information for



said associated processor; third storage means for storing processor-number-information of a called party as received from a calling party via said transfer means; fourth storage means for storing processor-selection-condition-information of said called party as received from said calling party via said transfer means; first comparison means for comparing the information stored in said first and third storage means; second comparison means for comparing the information stored in said second and fourth storage means; means for transmitting either a data-transfer-possible indication or a data-transfer-impossible-indication to said calling party via said transfer means in dependence upon comparison results of said first and second comparison means; fifth storage means for storing processor-number-information for designating said called party; sixth storage means for storing processor-selection-condition-information for selecting said called party; seventh storage means for storing one of said data-transfer-possible-indication and said data-transfer-impossible-indication sent back from said called party; and means for enabling data transmission upon identifying data-transfer-possible-information stored in said seventh storage means.

4,710,953

SPEECH CONTROL IN A TELEPHONE STATION

Josef Lampl, Schoengeising, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 29, 1986, Ser. No. 924,310

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3541794

Int. Cl.[4] H04M *1/58*

U.S. Cl. 379—391 **1 Claim**

1. In a telephone station of the type which includes a transmission channel and a receiving channel which are connected

by way of a hybrid to a subscriber line, in which the transmission channel includes a transmitting amplifier, and in which the receiving channel includes a receiving amplifier, the improvement therein comprising:

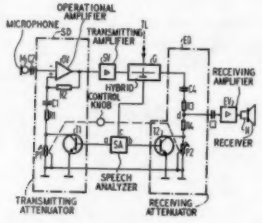
a speech analyzer including an input connected to the hybrid and first and second outputs, said speech analyzer operable in response to speech signals in the transmitting direction to provide a first signal at both of said first and second outputs and operable in response to speech signals in the receiving direction to produce a second signal both of said first and second outputs;

transmission attentuation means connected in said transmission channel, said transmission attentuation means comprising

an operational amplifier including a first input for receiving speech signals to be transmitted, an output connected to the transmitting amplifier, and a second input,

a feedback circuit connected between said output and said second input of said operational amplifier,

a first variable resistor connected in circuit with said second



input of said operational amplifier and said feedback path and connected to a reference potential, and

a first switch connected across said first variable resistor and including a control input connected to said first output of said speech analyzer; and

receiving attenuation means connected in the receiving channel between the hybrid and the receiving amplifier, said receiving attenuation means comprising

a second variable resistor connected between the receiving amplifier and the reference potential, and

a second switch connected across said second variable resistor and including a control input connected to said second output of said speech analyzer;

means connecting said first and second variable resistors for symmetrical operation including a single actuating element,

said first and second switches operable to close in response to said first signal and short the respective variable resistors and operable to open in response to said second signal so that the respective variable resistors are effective for controlling attenuation.

4,710,954

TELEPHONE SET LINE SWITCH

Francis S. Doyle, Oaklandon, and Randall W. France, Indianapolis, both of Ind., assignors to American Telephone and Telegraph Company AT&T Information Systems, Holmdel, N.J.

Filed Oct. 3, 1985, Ser. No. 783,586

Int. Cl.[4] H04M *1/08*

U.S. Cl. 379—427 **17 Claims**

1. A telephone line switch device comprising: a generally horizontall unitary synthetic-resinous switch actuating lever extending longitudinally front-to-rear and having at its front and rear, respectively, as integral parts thereof, (a) a laterally broad contact mounting head and (b) a laterally narrow upwardly-projecting plunger fin, pivot means for mounting said lever to be rockable about a lateral pivot axis therefor located in the length of said lever between its front end and its longitudinal center so that such lever is adapted by rocking to move said head at its front to up and down positions responsive to movement of said fin to respectively, a down and an up position, and a plurality of downward-facing laterally spaced metallic contacts carried by said head to be on the underside

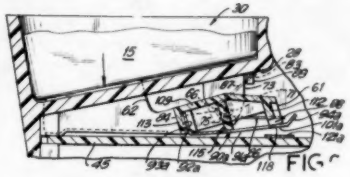


FIG. 6

thereof and adapted responsive to movement of the front of said head to respectively, its up position and down position to open and close, respectively, with corresponding fixed conductive elements underlying said head.

4,710,955

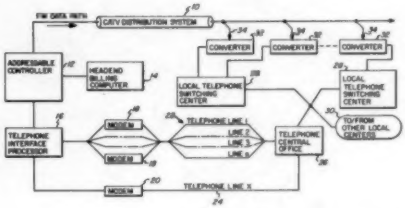
CABLE TELEVISION SYSTEM WITH TWO-WAY TELEPHONE COMMUNICATION PATH

Marc W. Kauffman, Cheltenham, Pa., assignor to General Instrument Corporation, New York, N.Y.

Filed Nov. 25, 1985, Ser. No. 801,574

Int. Cl.[4] H04N *7/167, 7/10*; H04M *11/00*

U.S. Cl. 380—10 **32 Claims**



1. Addressable television signal converter apparatus for providing impulse pay-per-view service on a cable television system or the like comprising:

means for receiving a band of signals from a television signal transmission path including scrambled television program signals for viewing on a pay-per-view basis;

data retrieval means coupled to said receiving means for retrieving converter data superimposed with said band of signals;

microprocessor means for processing converter data addressed thereto and retrieved by said data retrieval means;

tuner means coupled to said microprocessor and said receiving means for enabling a user to select a pay-per-view program and for descrambling the selected program for viewing by the user;

memory means coupled to said microprocessor for storing data indicative of pay-per-view programs selected by a user;

a modem means for interfacing said microprocessor to a telephone line;

auto-dial means responsive to converter data retrieved by said data retrieval means from said band of signals and processed by said microprocessor for dialing a telephone number, thereby enabling said converter apparatus to establish a separate telephone communication path independent of said television signal transmission path over which the microprocessor can communicate with a remote computer via said modem;

means operatively associated with said microprocessor for forwarding data stored in said memory means to a remote

computer via a telephone communication path established by said auto-dial means;

means operatively associated with said microprocessor for maintaining a time-out count;

means for inhibiting the view of pay-per-view programs if the time-out count expires; and

means for reinitializing said time-out count in response to an initialize signal received from a remote computer.

auto-dial means responsive to converter data retrieved by said data retrieval means and processed by said microprocessor for dialing a telephone number, thereby establishing a telephone communication path over which the microprocessor can communicate with a remote computer via said modem; and

means operatively associated with said microprocessor for forwarding data stored in said memory means to a remote computer via a telephone communication path established by said auto-dial means.

4,710,956

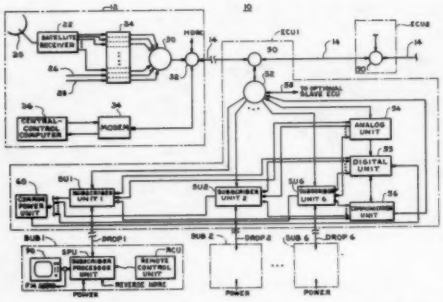
CABLE TELEVISION SYSTEM

Robert M. Rast, Englewood, Colo., assignor to American Television & Communications Corporation, Englewood, Colo.

Continuation of Ser. No. 616,412, May 31, 1984. This application Jan. 12, 1987, Ser. No. 4,850

Int. Cl.[4] H04N *7/167*

U.S. Cl. 380—20 **16 Claims**



1. A cable television system for providing selected television signals to a plurality of remotely located subscriber premises, having a head end for producing a television signal and a cable network for conducting the television signal from the head end to a plurality of remote locations, each of which is adjacent but external to a respective subset of the subscriber premises, comprising:

external control unit means at each of the remote locations for receiving the television signal from the cable network;

a plurality of drop cables connected to each external control unit means, each drop cable conducting a selected portion of the television signal from the external control unit means to a respective one of the subscriber premises associated with that external control unit means;

subscriber device means connected to each drop cable at the subscriber premises for applying to the drop cable a first control signal indicative of data to be transmitted to the external control unit means, at least one of said subscriber device means being a subscriber processing unit means for allowing the subscriber to apply to the drop cable a first control signal including channel data indicative of the portion of the television signal which that subscriber wishes to select;

processing means associated with each external control unit means for processinq the first control signals applied to all the drop cables associated with that external control unit means, for determining independently of the head end whether or not the portion of the television signal indicated by the channel data is authorized for viewing, and for causing that external control unit means to apply to each associated drop cable the portion of the television signal indicated by the first control signal channel data received via the drop cable if that portion is authorized, the processing means including common signal processing circuitry which at least partially processes the information represented by the first control signals applied to all of the drop cables associated with that external control unit means, and further including a microprocessor, alterable memory means for storing data representing which of the subscribers associated with the external control unit means is authorized to receive each particular portion of the television signal, and communication means for allowing the head end to modify the authorization data stored by the memory means;,

means associated with each external control unit means for applying to each drop cable a second control signal including data to be transmitted to the associated subscriber premises, at least a portion of which differs from the data included in the first control signal; and

means associated with each subscriber device means to receive and store the data included in the second control signal.

4,710,957

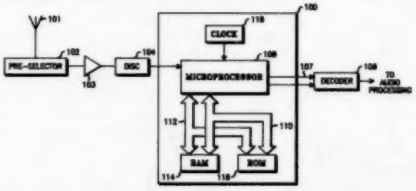
DATA DETECTION BY STATISTICAL ANALYSIS

Paul M. Bocci, Roselle; Carl M. Pietrzak, Jr., Schaumburg, and Alan L. Wilson, Hoffman Estates, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 30, 1986, Ser. No. 858,461

Int. Cl.[4] H04K *1/02*

U.S. Cl. 380—42 **6 Claims**



5. In a secure communication system, a method for detecting an encrypted signal from a received signal and for providing a decrypted information signal, comprising the steps of:

(a) storing the received signal to provide a stored signal;

(b) parsing said stored signal into segments having a predetermined length;

(c) parsing each of said segments into a plurality of sub-segments having a predetermined length;

(d) tallying the number of occurrences of each of a plurality of predetermined bit patterns defined by said predetermined length of said sub-segments;

(e) computing the difference of each of said tallied occurrences to a predetermined expected value of occurrences to provide a plurality of differences;

(f) summing said plurality of differences to provide a quality signal;

(g) comparing said quality signal to a predetermined threshold to provide a signal representing the detection of an encrypted signal;

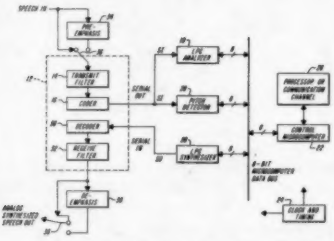
(h) operating, in response to step (g), upon said received signal to provide the decrypted information signal.

4,710,958

CIRCUIT FOR CONTROLLING SEPARATION AND HIGH-CUT OPERATION OF A STEREO DEMODULATOR IN AN FM RADIO RECEIVER

Satoru Tazaki, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed May 7, 1986, Ser. No. 860,639
Claims priority, application Japan, May 16, 1985, 60-105658
Int. Cl.[4] H04H 5/00
U.S. Cl. 381—10 **3 Claims**



1. In a stereo FM receiver having an S-meter responsive to a field strength indicating voltage supplied thereto and a stereo demodulator responsive to a control voltage supplied thereto for controlling adjusting the separation and high-cut properties of said demodulator, the improvement comprising:

control voltage generating means for generating said control voltage in response to said field strength indicating voltage;

voltage-current conversion means for converting to a ripple current a ripple component voltage present in said field strength indicating voltage;

a current mirror circuit responsive to said ripple current from the voltage-current conversion means for providing a mirror current corresponding thereto and having a controllably chosen ratio with respect thereto; and

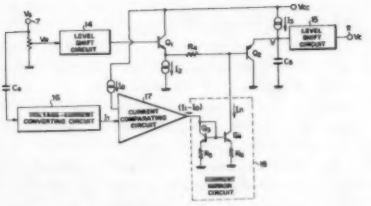
output means including a time-constant circuit and controllably responsive to said mirror current from said current mirror circuit for decreasing said control voltage in response to increase in said mirror current and outputting the resulting voltage via said time-constant circuit.

4,710,959

VOICE ENCODER AND SYNTHESIZER

Joel A. Feldman, North Cambridge, and Edward M. Hofstetter, Carlisle, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

PCT No. PCT/US82/00556, § 371 Date Dec. 19, 1983, § 102(e) Date Dec. 19, 1983, PCT Pub. No. WO83/03917, PCT Pub. Date Nov. 10, 1983
PCT Filed Apr. 29, 1982, Ser. No. 572,786
Int. Cl.[4] G10L 5/00
U.S. Cl. 381—36 **8 Claims**



1. In a signal processing digital voice encoding device including sampling means for sampling analog voice signals and producing discrete samples from a frame of said voice signals, the improvement comprising:

A first signal processing microprocessor in circuit with said sampling means and including foreground and background analyzing means for analyzing said samples by which said voice is modeled as a time-varying, linear, all-pole filter and a set of linear predictive reflection coefficients, which define the poles of said linear filter, are established by recursively filtering said samples from said sampling means, the foreground analyzing means multiplying, once each sample, speech datum in each sample by an appropriate Hamming weight which is recursively computed to obtain a set of correlation coefficients, and the background analyzing means computing from said correlation coefficients a set of linear predictice reflection coefficients and an energy estimate of said voice signal once each analysis frame;

a second signal processing microprocessor in circuit with said sampling means and including pitch detector means for making a voicing decision and, when the sample includes voiced speech, determining the pitch of the voice from the samples of the sampling means, said pitch detector means comprising a low pass filter, a peak detector, a pitch and voicing estimator and means for smoothing output signals; and

Controller microprocessor means in circuit with said first and second signal processing microprocessors for arranging the outputs of the analyzing means and the pitch detector means in a format suitable for digital transmission and for initializing said first and second processing elements with constants determining a sampling rate, an analysis frame size, and a linear predictive model order,

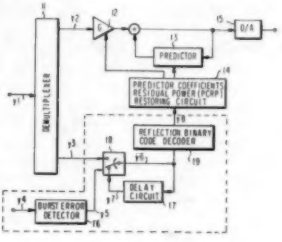
wherein said first and second signal processing microprocessors and said controller microprocessor means form a parallel, distributed, signal processing circuit.

4,710,960

SPEECH-ADAPTIVE PREDICTIVE CODING SYSTEM HAVING REFLECTED BINARY ENCODER/DECODER

Toshifumi Sato, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 21, 1984, Ser. No. 581,750
Claims priority, application Japan, Feb. 21, 1983, 58-26295
Int. Cl.[4] G10L 5/00
U.S. Cl. 381—47 **10 Claims**



1. A speech-adaptive predictive coding system including an encoding apparatus comprising:

means for dividing a speech signal into fixed frames to provide a framed speech signal;

means for extracting a predictor coefficient and residual power from each frame of said framed speech signal;

means responsive to the predictor coefficient and residual power from said extracting means for adaptively, predictively encoding said framed speech signal to provide a predicted residual sequence;

means for converting parameter information representing said predictor coefficient and residual power into a reflected binary code; and

means for multiplexing said predicted residual sequence and the parameter information sequence converted into said reflected binary code.

4,710,961

MINIATURE HEARING AID HAVING A BINDABLE MULTI-LAYERED AMPLIFIER ARRANGEMENT

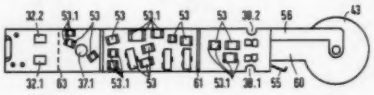
Gerhard Büttner, Grossenseebach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 20, 1985, Ser. No. 736,006

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1984, 8428488[U]

Int. Cl.⁴ H04R *25/00*

U.S. Cl. 381—68.7 **7 Claims**



1. A miniature hearing aid of the type having a housing with a substantially convex profile in which at least the following electrical components are included, an input transducer, an amplifier with control elements, a current source, and an output transducer, where at least a portion of the amplifier is formed on component mounting surfaces hinged together and connections among the components are provided by a support with electrically conducting paths, characterized in that:

said amplifier includes a multi-layered arrangement of said component mounting surfaces having a substantially elongated rectangular shape and which is bendable so that after having been installed in said hearing aid housing said multi-layered arrangement can conform to said substantially convex profile;

said multi-layered arrangement comprising at least three layers, of which the two outer layers are adapted for the attachment of said electrical components thereon and lie over a flexible continuous layer intermediate said two outer layers, said continuous layer running the length of said elongated rectangular shaped multi-layered arrangement and provided with conductor paths; and

said amplifier being sub-divided into structural sections of said multi-layered arrangement, each structural section comprising a group of electrical components which are attached thereto, adjacent structural sections being separated by bending zones, each bending zone having a length extending in a direction perpendicular to the length of said multi-layered arrangement and having a width which is relatively narrow so as to allow said bending zones to be bent only in a direction perpendicular to the plane of the multi-layered arrangement, and said electrical components being arranged on both sides of at least some of said structural sections.

4,710,962

SIGNAL CONTROL APPARATUS

Toshiyuki Matsui, Tokyo, Japan, assignor to Kabushiki Kaisha Kenwood, Japan

Filed Nov. 13, 1985, Ser. No. 797,664

Claims priority, application Japan, Nov. 14, 1984, 59-172516[U]

Int. Cl.⁴ H03G *5/00*

U.S. Cl. 381—102 **4 Claims**

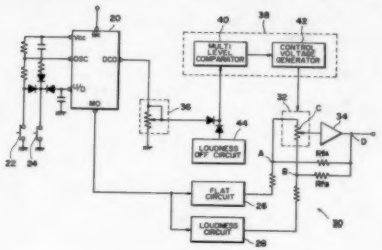
1. Loudness control circuitry comprising:

a volume controller in response to a setting position for setting the magnitude level of an audio input signal;

a first circuit for transmitting the magnitude level set audio input signal through a flat transmission characteristics with respect to frequencies;

a second circuit for trasmitting the magnitude level set audio input signal through a loudness transmission characteristics with respect to frequencies; and

an adder for summing the output from said first circuit and



the output from said second circuit, the adder including means for adjusting the summing ratio of the outputs from said first and second circuit independence upon the volume controller setting position.

4,710,963

APPARATUS FOR SENSING THE CONDITION OF A DOCUMENT

Victor B. Chapman, and Paul D. Lacey, both of Hants, England, assignors to De La Rue Systems Ltd., England

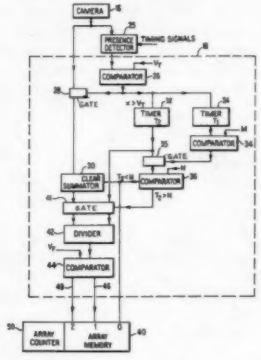
PCT No. PCT/GB85/00414, § 371 Date May 9, 1986, § 102(e) Date May 9, 1986, PCT Pub. No. WO86/01923, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 11, 1985, Ser. No. 870,766

Claims priority, application United Kingdom, Sep. 11, 1984, 8422928

Int. Cl.⁴ G06K *9/60*

U.S. Cl. 382—7 **16 Claims**



1. Apparatus for determining the fitness of a document by determining its degree of soiling, comprising:

(A) sensor means for providing a reflectance signal representing the intensity of light reflected from a sensed element of the face of the document; and

(B) signal processing means responsive to the reflectance signals from the sensor corresponding to sensed elements on the face of the document to provide a "fit" or an "unfit" signal for a document, depending upon the degree of soiling, the signal processing means including:

(1) a first comparator for comparing the level of the signal from the sensor means with a first predetermined threshold;

(2) means for integrating the signal only over periods in which the signal level exceeds the first predetermined

threshold, to provide a total reflectance signal indicative of the total reflectance of the brighter areas of the face of the document;

(3) means for providing a duration signal representing the total time that the reflectance signal level exceeds the first threshold; and

(4) means for comparing the total reflectance signal and the duration signal to provide a "fit" or "unfit" output signal.

4,710,964

PATTERN RECOGNITION APPARATUS USING OSCILLATING MEMORY CIRCUITS

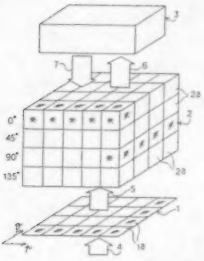
Youko Yamaguchi; Hiroshi Shimizu; Ichiro Tsuda, all of Tokyo; Masafumi Yano, Chiba, and Tokiko Okumura, Tokyo, all of Japan, assignors to Research Development Corporation of Japan, Tokyo, Japan

Filed Jul. 7, 1986, Ser. No. 882,470

Claims priority, application Japan, Jul. 6, 1985, 60-149034[U]

Int. Cl.⁴ G06K *9/48*

U.S. Cl. 382—17 **5 Claims**



1. A pattern recognition apparatus which includes a pattern preprocessing part having a plurality of outputs, a clock oscillator, and an information consolidator and a memory having a plurality of nonlinear oscillating circuits, respectively, characterized in that

each of the oscillating circuits includes a plurality of inputs for controlling the oscillation condition and at least one output;

the output of each oscillating circuit in the information consolidator being interconnected to predetermined inputs of other oscillating circuits in a predetermined relation, and the inputs of the oscillating circuits being coupled to the outputs of the pattern preprocessing part in a predetermined distribution;

the clock oscillator being connected to receive as a main exciting signal, the sum of a group of signals obtained by phase-adjusting the outputs of a substantial part of oscillating circuits contained in the information consolidator;

the respective oscillating circuits in the memory being connected to receive, as a main exciting signal, the output of the clockoscillator, and said oscillating circuits also being divided into a predetermined number of groups so that the sum of the outputs of the oscillating circuits in each group given an elementary signal of a pattern reference memory data; and

further including waveform comparison means for comparing the elementary signal of the memory data with the direct sum of the outputs of the said substantial part of oscillating circuits in the information consolidator, so that the result of comparison is applied to inputs of the oscillating circuits of the memory.

4,710,965

IMAGE DATA MASKING DEVICE

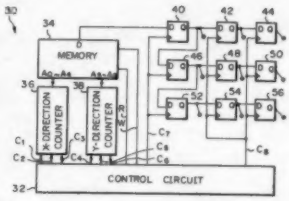
Kiyohiko Kobayashi, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 26, 1985, Ser. No. 759,323

Claims priority, application Japan, Jul. 30, 1984, 59-160020

Int. Cl.⁴ G06K *9/36*

U.S. Cl. 382—41 **4 Claims**



1. A masking device for masking pixel data on the basis of $(2n+1)\times(2n+1)$ pixels, where n is a positive integer, comprising:

an image memory for storing the pixel data;

accessing means for directly accessing in two dimensions the pixel data stored in said image memory, said accessing means including an X direction address means and a Y direction address means for determining the location of said pixel data;

first shift register means for directly receiving $(2n+1)$ pixel data read out of said image memory and for serially shifting said pixel data at each time of accessing, each stage of said first shift register means being connected to a gate means including a first AND gate, a second AND gate and an OR gate with the outputs of said first AND gate and said second AND gate forming the inputs of said OR gate and the output of said OR gate forming the input to the stage, said AND gates being connected to said memory so that said pixel data may be received at either end of said first shift register means; and

2n second shift register means connected sequentially to said first shift register for shifting in parallel said pixel data from said first shift register means in synchronism.

4,710,966

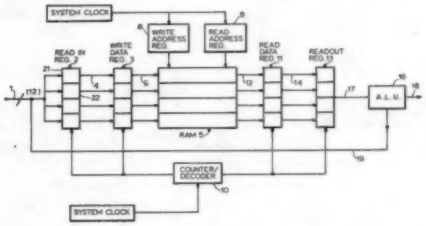
DIGITAL FRAME PROCESSOR PIPE LINE CIRCUIT

James M. Aufiero, Reading, Mass., assignor to Itek Corporation, Lexington, Mass.

Continuation of Ser. No. 568,025, Jan. 4, 1984, abandoned. This application Nov. 12, 1986, Ser. No. 930,041

Int. Cl.⁴ G06K *9/00*; **G06F** *13/00*

U.S. Cl. 382—69 **5 Claims**



1. A method of writing q-bit words into and reading q-bit words out of a memory having an access time longer than a system clock period of p ns comprising: providing a memory having an N×q bit word size, a read-in register with N [×] q-bit sections and a read-out register with n q-bit sections; for writing into said memory, loading N q-bit words into the sections of said register in sequence each in said period of p ns

and then transferring the N×q-bit contents of said register to said memory simultaneously; and, for reading, simultaneously transferring an N×q-bit work from said memory to said read-out register and then sequentially reading out the contents of the sections of said read-out register q-bits at a time, each in p ns, whereby a period N×p ns will be available for writing into and reading out of said memory N×q-bits at a time.

4,710,967

DOUBLE-WALL SACK MADE OF CIRCULAR-WOVEN TUBE WITH GATHERED LOOP

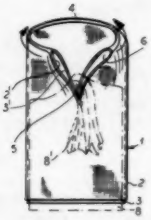
Goetz Petschner, Zollikon, Switzerland, assignor to IMAG-Verlage AG fur Immaterialguterrecht, Zug, Switzerland

Continuation of Ser. No. 665,639, Oct. 29, 1984, abandoned. This application Nov. 13, 1986, Ser. No. 930,980

Claims priority, application Switzerland, Nov. 9, 1983, 6032/83

Int. Cl.[4] B65D *33/10*

U.S. Cl. 383—8 **5 Claims**



1. A sack comprising:

a circularly woven fabric tube having an outer portion and an inner portion unitarily joined thereto at a fold, the inner portion lying within the outer portion and extending the full length thereof from the fold, the portions having lower ends spaced from the fold;

means for connecting the lower ends together to form a sack bottom, the tube being formed with a single cut in both portions extending across the fold and toward the sack bottom, the cut forming a pair of adjacent openings between the portions; and

means extending through the cut between the portions along the full length of the fold for gathering the tube to form a suspension loop and to form a filling mouth opening laterally at the openings into the inner portion.

4,710,968

TRIDENT INTERLOCKING CLOSURE PROFILE CONFIGURATION

Michael G. Borchardt, Woodridge; Robert T. Dorsey, and Ewald A. Kamp, both of Chicago, all of Ill., assignors to First Brands Corporation, Danbury, Conn.

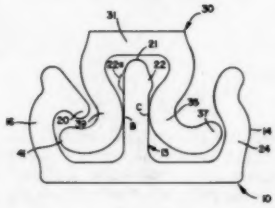
Filed Sep. 11, 1985, Ser. No. 774,997

The portion of the term of this patent subsequent to Dec. 24, 2002, has been disclaimed.

Int. Cl.[4] B65D *33/24*

U.S. Cl. 383—63 **25 Claims**

1. A closure fastening device comprising a first closure element and a second closure element; said first closure element having a general omega shape, comprising an apex portion and a profile portion extending from said apex portion, said profile portion comprising two spaced apart inwardly curved arm portions terminating in two outwardly facing curvilinear hook portions; said second closure element having a general trident shape, comprising in apex portion and a profile portion extending in a generally perpendicular direction. From said apex portion, said profile portion comprising a first arm portion, a second arm portion, and a third arm portion, said first arm portion, said second arm portion, and said third arm portion being generally parallel to and spaced apart from each other, said first arm portion comprising a base portion curving generally outwardly, a middle portion curving generally inwardly, and a top portion curving inwardly forming a hook portion and then terminating in an outwardly extending hook projection portion and an inwardly extending hook projection portion which is larger than said outwardly extending hook projection portion; said second arm portion comprising a



generally straight structure extending perpendicularly from said apex portion, said third arm portion comprising a base portion curving generally outwardly, a middle portion curving generally inwardly, and a top portion curving generally outwardly prior to terminating in an outwardly extending funnel portion, said first closure element and said second closure element forming an interlocked closure fastening device when they are occluded together.

4,710,969

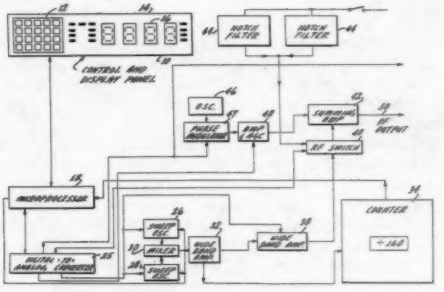
CATV TESTING SYSTEM

Sydney Fluck, Jr., Milford, Pa., and Marvin L. Milholland, Indianapolis, Ind., assignors to Wavetek Corporation, San Diego, Calif.

Continuation of Ser. No. 120,901, Feb. 12, 1980, abandoned. This application Dec. 1, 1981, Ser. No. 326,216

Int. Cl.[4] H04B *17/00*

U.S. Cl. 455—67 **29 Claims**



1. In combination for use at a receiver for monitoring and analyzing the quality of signals passing through a cable in successive television frame times where television signals for the successive time frames are passed through the cable and digital signals are provided in the cable in serial form to represent information relating to the parameters of a frequency sweep and where first and second pass signals are provided in the cable to define successive frame times and where sweep signals are provided in the cable in synchronism with the second pass signal in the pair and where the digital signals, the pass signals and the sweep signals are transmitted through the cable to the receiver,

first means for recovering the pass signals, the sweep signals, the digital signals and the television signals in the successive frames,

second means for storing representations of the recovered signals in the successive frame times,

third means responsive to the second pass signal for passing

the representations of the recovered signals from the second means, and

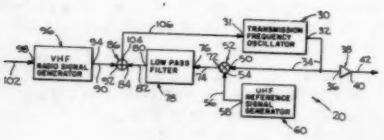
fourth means responsive to the recovered signals from the first means and the representations of the recovered signals from the third means for subtracting such recovered signals to recover the sweep signals.

4,710,970

METHOD OF AND APPARATUS FOR GENERATING A FREQUENCY MODULATED ULTRAHIGH FREQUENCY RADIO TRANSMISSION SIGNAL

Joseph C. Wu, Saratoga; Yee-Shing Law, Milpitas, and John James, Los Gatos, all of Calif., assignors to TFT, Inc., Santa Clara, Calif.

Filed Sep. 11, 1985, Ser. No. 774,989
Int. Cl.[4] H04B 1/04
U.S. Cl. 455—113 **13 Claims**



1. An ultrahigh frequency transmitter for transmitting an ultrahigh radio frequency transmission signal frequency modulated by a program signal, said transmitter comprising:

(a) a transmission frequency oscillator for generating an ultrahigh frequency transmission signal, said transmission frequency oscillator having a voltage input terminal for controlling the frequency of the ultrahigh frequency transmission signal generated by said transmission frequency oscillator;

(b) an ultrahigh frequency reference frequency generator for generating an unmodulated ultrahigh frequency reference frequency signal;

(c) mixing means for heterodyning a sample of said ultrahigh frequency transmission frequency signal and said unmodulated ultrahigh frequency reference frequency signal to produce an ultrahigh frequency difference signal;

(d) a very high frequency generator for generating a very high frequency signal frequency modulated by the program signal; and

(e) a phase detector receiving said ultrahigh frequency difference signal and said frequency modulated very high frequency signal for applying a voltage to said voltage input terminal of said transmission frequency oscillator for transmitting a stabilized ultrahigh frequency transmission signal frequency modulated by a program signal.

4,710,971

CHANNEL SELECTING DEVICE FOR CATV TERMINAL UNIT

Takashi Nozaki, and Takashi Hashimoto, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 20, 1985, Ser. No. 767,448
Claims priority, application Japan, Aug. 20, 1984, 59-173521
Int. Cl.[4] H04B 1/16
U.S. Cl. 455—179 **3 Claims**

1. A channel selecting device of a CATV terminal unit in which displayed channels can be changed with respect to received channels comprising:

a converter having a CATV signal as its input;

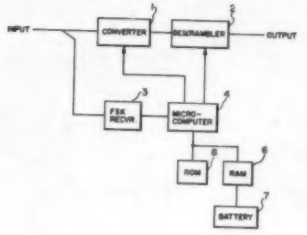
an FSK receiver having said CATV signal as an input;

a descrambler receiving the output of said converter as an input;

a microcomputer for controlling said converter and said descrambler and having the said output signal of said FSK signal receiver as its input;

a ROM for storing a programmed channel code table, said ROM accessed by said microcomputer;

a memory containing a compressed code of said channel code table the contents of which can be externally written



with respect to said displaying channels, said memory programmed by said microcomputer and the compressed code of said channel code table includes indications of first and last ones of continuous channels.

4,710,972

SHF RECEIVER

Toshihide Hayashi, Tokyo; Osamu Yamakami, and Ikuo Kanayama, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 2, 1986, Ser. No. 914,305
Claims priority, application Japan, Oct. 21, 1985, 60-234976
Int. Cl.[4] H04B 11/16; F29Q 23/08
U.S. Cl. 455—179 **5 Claims**

1. An apparatus for receiving satellite broadcast signals broadcast in a number of channels occupying successively overlapping frequency bands with a first plane of polarization for first alternate channels and a second plane of polarization for second channels arranged between said first channels, said apparatus comprising:

antenna means for receiving said satellite broadcast signals;

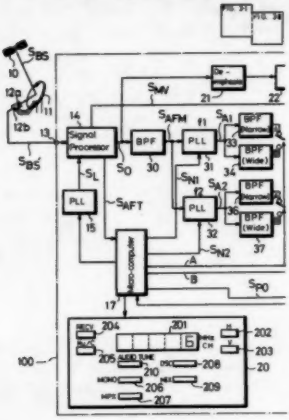
polarizer means for receiving a satellite broadcast signal derived from said antenna means and providing a plane of polarization adapted to be switched for correspondence with the plane of polarization of the received satellite broadcast signal;

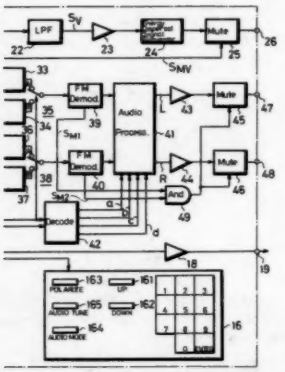
channel selecting means for sequentially selecting the channels of said satellite broadcast signals;

means for tuning to each channel selected by said channel selecting means; and

controlling means for automatically controlling the sequential selecting of the channels, the tuning of said tuning means and the switching of the plane of polarization of said polarizer means in accordance with a channel selected by said channel selecting means, said controlling means causing said channel selecting means to first select sequentially from among said first alternate channels having said first plane of polarization, and thereafter automat-

ically switching the plane of polarization of said polarizer means and then causing channel selecting in sequence





from among said second channels having said second plane of polarization.

4,710,973

VARACTOR DIODE TUNER WITH BAND SWITCHED COILS AND LINES

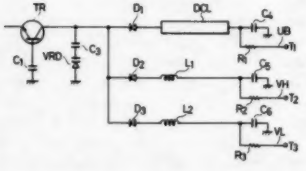
Takeo Suzuki, Soma, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Dec. 26, 1985, Ser. No. 813,651

Claims priority, application Japan, Dec. 26, 1984, 59-199532[U]

Int. Cl.[4] H03J *5/24*

U.S. Cl. 455—180 **7 Claims**



1. In a tuner having a common transistor in a high-frequency amplification circuit an a common varactor diode in a local resonant circuit in which a band switching signal corresponding to a channel selected from a plurality of UHF and VHF bands applied to said tuner to form a suitable resonant circuit for receiving television signals of the selected channel, the improvement which comprises:

said common varactor diode connected to ground at one end;

a plurality of resonant coils each connnected to ground at one end;

a distribution constant line connected to ground at one end, each of said coils and said line being provided for forming a resonant circuit with said common varactor for tuning said tuner to a respective one of said bands;

a plurality of switching diodes, each switching diode having one end connected to the other end of a respective one of said coils and said line and each switching diode's other end connected to the other end of said common varactor diode; and

means for turning on and off said switching diodes selectively in response to said band switching signal.

4,710,974

CIRCUIT ARRANGEMENT FOR A TUNER FOR CHANGING OVER SEVERAL FREQUENCY RANGES

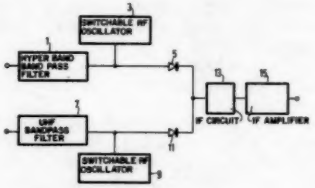
Karl-Heinz Kupfer, Krefeld, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 28, 1986, Ser. No. 835,124

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1985, 3507865

Int. Cl.[4] H04B *1/26*

U.S. Cl. 455—190 **8 Claims**



1. A television tuner circuit, comprising:

(a) first tunable filter means having an input and an output, for receiving first signals at said input, for filtering said signals, and for passing desired signals within a first frequency range to said output;

(b) first switchable RF oscillator means for providing a signal which when mixed with said passed signal of said first tunable filter means will result in an IF signal, said first switchable RF oscillator means including an output coupled to the output of said first tunable filter means, and means for switching said RF oscillator means on and off;

(c) first diode means having an anode input and a cathode output, with the anode of said first diode means connected to the coupled output of said first tunable filter means and said first switchable RF oscillator means, wherein when said first switchable RF oscillator means is switched on by said switching means, said first diode mixes said signals output by said first tunable filter means and said first switchable RF oscillator means to periodically provide an IF signal at the output cathode, and wherein when said first switchable RF oscillator means is switched off by said switching means, said first diode means cuts off the signals passed by said first tunable filter;

(d) second tunable filter means having an input and output, for receiving second signals at its input, for filtering said signals, and for passing desired signals within a second frequency range to its output;

(e) second switchable RF oscillator means for providing a signal which when mixed with said passed signals of said

second tunable filter means will result in an IF signal, said second switchable RF oscillator means including an output coupled to the output of said second tunable filter means, and second means for switching said second switchable RF oscillator means on and off;

(f) second diode means having an anode input and a cathode output connected to the cathode of said first diode means, with the anode of said second diode means connected to the coupled output of said second tunable filter means and said second switchable RF oscillator means, wherein when said second switchable RF oscillator means is switched on by said second switching means, said second diode mixes said signals output by said second tunable filter means and said second switchable RF oscillator means to periodically provide an IF signal at the output cathode, and wherein when said second switchable RF oscillator means is switched off by said second switching means, said second diode means cuts off the signals passed by said second tunable filter; and

(g) a common IF circuit means having an input connected to the outputs of said first and second diode means.

4,710,975

SPACE DIVERSITY RECEPTION SYSTEM HAVING COMPENSATION MEANS OF MULTIPATH EFFECT

Yoshiharu Okamoto, Yokosuka; Izumi Horikawa, Yokohama, and Shozo Komaki, Yokosuka, all of Japan, assignors to Nippon Telegraph & Telephone Public Corp., Tokyo, Japan

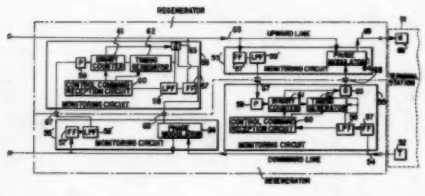
Division of Ser. No. 113,591, Jan. 21, 1980, Pat. No. 4,326,294. This application Apr. 5, 1982, Ser. No. 365,345

Claims priority, application Japan, Feb. 13, 1979, 54-14359; Mar. 28, 1979, 54-35643; Apr. 4, 1979, 54-39743; Nov. 19, 1979, 54-148867

The portion of the term of this patent subsequent to Oct. 1, 2001, has been disclaimed.

Int. Cl.⁴ H04B 7/08

U.S. Cl. 455—276 **12 Claims**



10. A space diversity reception system comprising a pair of spaced antenna means, a phase shifter means connected to a first one of said pair of antenna means for shifting the phase of a signal received by said first antenna means, a combiner connected to the output of said phase shifter means, phase modulating means including a sensing oscillator coupled to a second one of said pair of antenna means for phase modulating a signal received by said second antenna means, said combiner further coupled to the output of said phase modulating means and control means for the control of said phase shifter means wherein said control means comprises a plurality of level detectors connected to the output of said combiner for providing levels at a plurality of frequency points in a reception passband, and a control circuit for controlling said phase shifter means according to the output of said level detectors and wherein said control means controls said phase shifter means so that the phase of an interference wave received by said first antenna means is opposite at the input of said combiner to that received by said second antenna means, and interference waves of said pair of antenna means are cancelled by each other.

4,710,976

OPTICAL REPEATER MONITORING SYSTEM

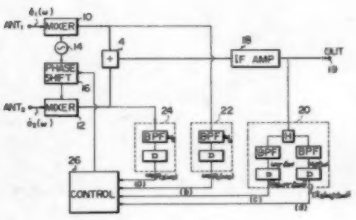
Hiroharu Wakabayashi, and Yasuhiko Niiro, both of Kanagawa, Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan

Filed May 7, 1985, Ser. No. 731,642

Claims priority, application Japan, May 16, 1984, 59-96662

Int. Cl.⁴ H04B 9/00

U.S. Cl. 455—601 **4 Claims**



1. An optical repeater monitoring system for an optical digital transmission system, said optical repeater monitoring system comprising:

transmission stations having terminal transmitter means for transmitting control commands and a burst carrier;

a pair of opposite direction lines between said transmission stations, said pair of opposite direction lines being a first line and a second line;

a plurality of repeaters inserted in said lines, each of said repeaters having at least a pair of regenerators, each of said regenerators having a pair of monitoring circuits, said monitoring circuits includes,

a flip-flop means for dividing frequency of signals in said first line to derive said control commands and said burst carrier,

a command control reception means for receiving and for detecting said control commands and said burst carriers in said first line from said flip-flop means,

a counter means for detecting parity errors in said second line and for counting parity errors,

a timing generation means for reading said counter means when said control command reception means detects said burst carrier in said first line, and

a phase modulator means for performing phase modulation to a clock pulse derived from said second line according to a binary code in said counter means,

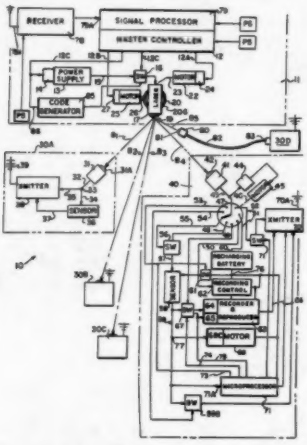
wherein said control commands and said burst carrier being constituted by arranging parity bits of in-service data in said first line, said control commands including first, second and third control commands, said first control command for controlling said plurality of repeaters to start said error counting in said second line and to store the number of errors in said counter means, said second control command for controlling said plurality of repeaters to stop said error counting in said second line, said third control command for designating a particular regenerator to return errors to said transmission station, and said burst carrier for sending errors from said counter means to said transmission station, said errors being sent by phase modulation of clock pulses for in-service data in said second line.

4,710,977

COMMUNICATION SYSTEM AND METHOD

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Division of Ser. No. 885,268, Mar. 10, 1978, Pat. No. 4,434,510.
This application Feb. 27, 1984, Ser. No. 583,670
The portion of the term of this patent subsequent to Feb. 28, 2001, has been disclaimed.
Int. Cl.[4] H04B *9/00*
U.S. Cl. 455—603 **10 Claims**



1. A communication system comprising in combination:

a computer including a central processing unit for processing information,

first means controlled by said computer for generating radiation,

second means controlled by said computer for modulating the radiation generated by said first means with control information,

a plurality of control locations remote from said first means,

means for selectively transmitting the radiation generated by said first means to selected of said plurality of control locations,

third means at each of said control locations for receiving radiation generated by said first means and directed thereto,

fourth means at each of said control locations for converting a first portion of the received radiation from said first means to operating electrical energy and a second portion of such received radiation to control electrical signals defined by the control information with which said radiation is modulated,

an electrically operated device at each of said control locations and fifth means for applying and said operating electrical energy received to operate said electrical device,

sixth means for controlling the operation of the electrically operated device of each control location,

seventh means for applying said control electrical signals to said sixth means to cause said sixth means to control the operation of said electrical device,

eighth means at each of said control locations for generating feedback signals indicative of the operation of said electrical device,

nineth means including short wave signal transmitting means at each control location for receiving signals generated by said eighth means and short wave transmitting same,

tenth means for short wave receiving signals transmitted by said ninth means and converting said signals to electrical signals, and

eleventh means connected to receive said latter electrical signals, perform computations thereon and control the operation of said first and second means.

DESIGN PATENTS

GRANTED DEC. 1, 1987

ERRATA

For CLASS	See PATENT NO.
D10-075	292,979
D32-006	293,021
D05-061	293,039

292,940

TACO SHELL

David J. DiPietro, 4840 E. Sunnyside Dr., Scottsdale, Ariz. 85254

Filed May 18, 1984, Ser. No. 611,995

Term of patent 14 years

U.S. Cl. D1—122

292,941

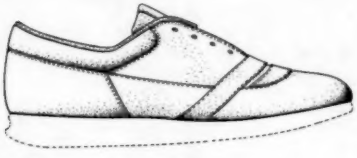
SHOE UPPER

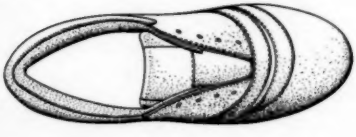
Brenda Kelley, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.

Filed Jan. 29, 1987, Ser. No. 8,418

Term of patent 14 years

U.S. Cl. D2—314





292,942

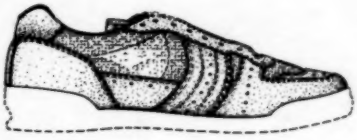
SHOE UPPER

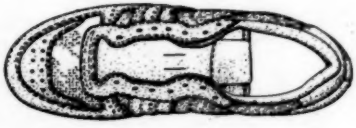
Lawrence Selbiger, Portland, and John Ludeman, West Linn, both of Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.

Filed Jan. 29, 1987, Ser. No. 8,400

Term of patent 14 years

U.S. Cl. D2—314





292,943

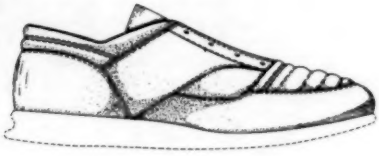
SHOE UPPER

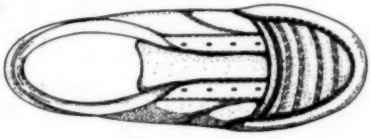
James K. Tong, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.

Filed Jan. 29, 1987, Ser. No. 8,413

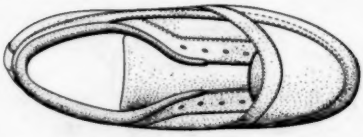
Term of patent 14 years

U.S. Cl. D2—314

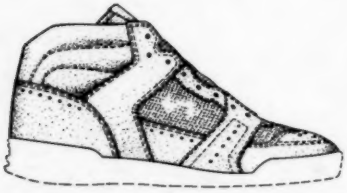


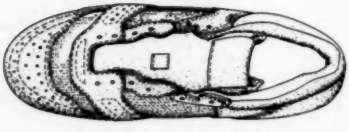


292,944
SHOE UPPER
Brenda Kelley, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.
Filed Jan. 29, 1987, Ser. No. 8,420
Term of patent 14 years
U.S. Cl. D2—314



292,945
SHOE UPPER
Lawrence Selbiger, Portland, and John Ludeman, West Linn, both of Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.
Filed Jan. 29, 1987, Ser. No. 8,462
Term of patent 14 years
U.S. Cl. D2—314

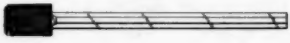




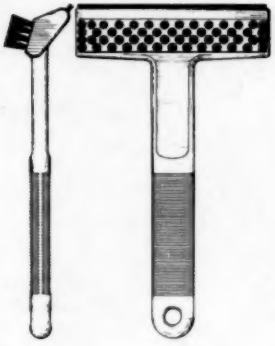
292,946
SHOE SOLE
Jerry D. Stubblefield, and Lawrence Selbiger, both of Portland, Oreg., assignors to The Donner Mountain Corporation, San Rafael, Calif.
Filed Jan. 9, 1987, Ser. No. 1,925
Term of patent 14 years
U.S. Cl. D2—320

292,947
UMBRELLA GEAR HOUSING
Edward D. Levy, Fort Lee, N.J., assignor to Finkel Outdoor Products, Inc., New York, N.Y.
Filed Jan. 25, 1985, Ser. No. 694,992
Term of patent 14 years
U.S. Cl. D3—10

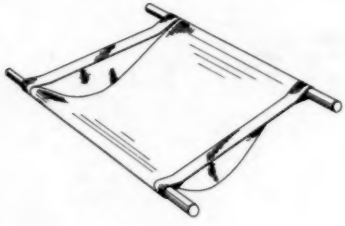
292,948
DENTURE BRUSH
Emil Parina, 19600 Milan Dr., Maple Heights, Ohio 44137
Filed Jun. 8, 1987, Ser. No. 59,472
Term of patent 14 years
U.S. Cl. D4—104



292,949
CLEANING DEVICE FOR AUTOMOBILE WINDOWS
Roland Vetter, Giengen-Sachenhausen, Fed. Rep. of Germany, assignor to Schwaebische Buerstenfabrik Hans Haug KG, Koenigsbrunn, Fed. Rep. of Germany
Filed Jul. 3, 1985, Ser. No. 752,228
Term of patent 14 years
U.S. Cl. D4—116

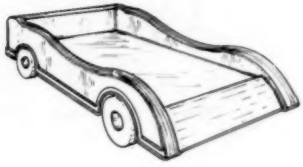


292,950
SEAT FOR A TRUCK BED
Steven A. Fry, 30052 Running Deer La., Laguna Niguel, Calif. 92677, and Rodney L. Stafford, 100 S. Seranado, #44, Orange, Calif. 92669
Filed Dec. 20, 1984, Ser. No. 683,890
Term of patent 14 years
U.S. Cl. D6—356



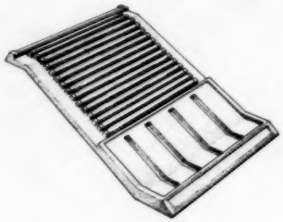
292,951
CHAIR
Thomas Lamb, 31 Marietta Street, Uxbridge, Ontario, Canada L0C 1K0
Filed Apr. 18, 1985, Ser. No. 724,748
Claims priority, application Canada, Mar. 16, 1985, 15-03-85-2
Term of patent 14 years
U.S. Cl. D6—470

292,952
BED
Thomas O. Mercurio, 40 Gladys Ct., Warwick, R.I. 02886
Filed Dec. 4, 1986, Ser. No. 938,738
Term of patent 14 years
U.S. Cl. D6—388

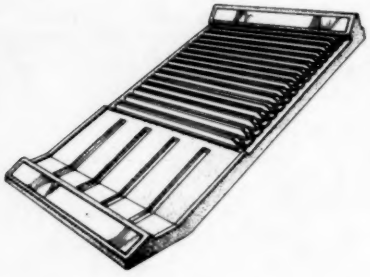


292,953
PLANT STAND
Carol Cave, 4550 Hickory Hill Dr., Stephens City, Va. 22655
Filed Jan. 16, 1985, Ser. No. 691,936
Term of patent 14 years
U.S. Cl. D6—405

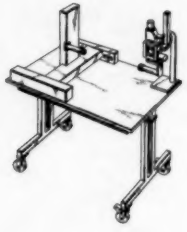
292,954
CARPET DISPLAY STAND
James L. Knight, Rte. 7, Cumming, Ga. 30130, and Christopher C. Bidwell, 342 Summer Pl., Norcross, Ga. 30071
Filed Apr. 6, 1984, Ser. No. 597,342
Term of patent 14 years
U.S. Cl. D6—409



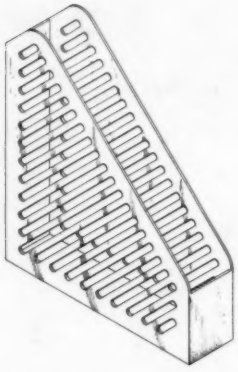
292,955
CARPET DISPLAY STAND
James L. Knight, Rte. 7, Cumming, Ga. 30130
Filed Feb. 6, 1985, Ser. No. 699,121
Term of patent 14 years
U.S. Cl. D6—409



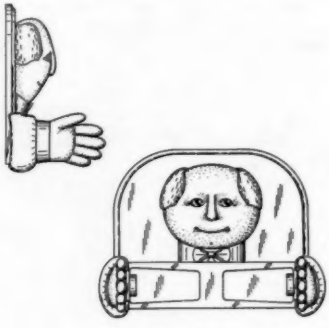
292,956
CONTROL DESK FOR USE IN CONTROLLING AN INDUSTRIAL ROBOT
Akifumi Inoue, Hamamatsu, and Koshiro Takeda, Hamamatsu-shi, both of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan
Filed May 8, 1985, Ser. No. 731,800
Claims priority, application Japan, Nov. 20, 1984, 59-47657
Term of patent 14 years
U.S. Cl. D6—449



292,957
MAGAZINE RACK
Bernd Briissing, Neu-Ulm, Fed. Rep. of Germany, assignor to Hans Friedrich Hefendehl, Kierspe, Fed. Rep. of Germany
Filed May 13, 1985, Ser. No. 733,586
Claims priority, application Fed. Rep. of Germany, Feb. 6, 1985, MR619
Term of patent 14 years
U.S. Cl. D6—475



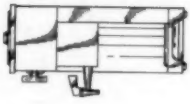
292,958
PAPER TOWEL HOLDER
Dawn M. Likness, MPO. 70L Riverside Dr., and Marvel M. LaRue, MPO. 63L Riverside Dr., both of Washougal, Wash. 98671
Filed Jun. 10, 1985, Ser. No. 743,302
Term of patent 14 years
U.S. Cl. D6—522

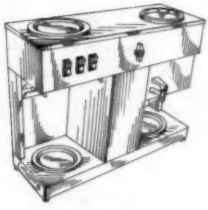


292,959
WHISK
Morgan Ferm, and Karl A. Andersson, both of Malmo, Sweden, assignors to Hammarplast AB, Tingsryd, Sweden
Filed Apr. 30, 1985, Ser. No. 729,037
Claims priority, application Sweden, Oct. 31, 1984, 842905
Term of patent 14 years
U.S. Cl. D7—103

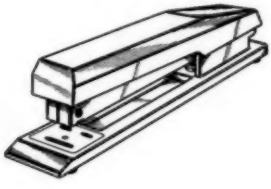
292,960
SPOON
Vivienne D. Jagger, West Perth, Australia, assignor to Little People Limited, Hong Kong
Filed Mar. 5, 1985, Ser. No. 708,318
Term of patent 14 years
U.S. Cl. D7—137

292,961
COFFEE BREWER AND HOT WATER DISPENSER
Donald L. Daugherty, Springfield, Ill., assignor to Bunn-O-Matic Corporation, Springfield, Ill.
Filed Nov. 7, 1984, Ser. No. 669,242
Term of patent 14 years
U.S. Cl. D7—309

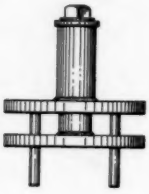




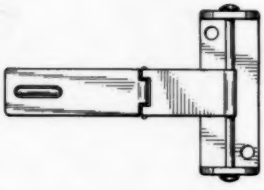
292,962
STAPLER
John Leszczak, Roselle Park, N.J., assignor to The Bates Manufacturing Company, Hackettstown, N.J.
Filed Apr. 2, 1985, Ser. No. 718,847
Term of patent 14 years
U.S. Cl. D8—50



292,963
HUB-REMOVING TOOL
Bernard H. Murtaugh, c/o Connolly and Hutz, 1220 Market St., P.O. Box 2207, Wilmington, Del. 19899-2207
Filed May 23, 1985, Ser. No. 737,106
Term of patent 14 years
U.S. Cl. D8—51



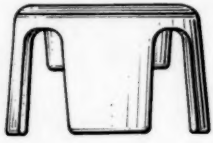
292,964
SELF-ADJUSTING HASP
Ronald H. Kaye, R.D. #1, Fairfield, Vt. 05455, and Robert H. Lumbra, R.D. #1, Fairfax, Vt. 05454
Filed Sep. 9, 1985, Ser. No. 773,924
Term of patent 14 years
U.S. Cl. D8—344



292,965
CONTAINER FOR CUSHIONS
Selwyn H. Fein, P.O. Box 4856, Johannesburg 2000, South Africa
Filed Aug. 24, 1984, Ser. No. 643,716
Term of patent 14 years
U.S. Cl. D9—418

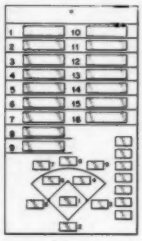
292,966
COMBINED BULB AND CAP FOR A DROPPER APPLICATOR
James F. Gager, New York, N.Y., assignor to Estee Lauder Inc., New York, N.Y.
Filed Dec. 23, 1983, Ser. No. 565,155
Term of patent 14 years
U.S. Cl. D9—436

292,967
BOTTLE CAP
Paul L. Gagnon, 3714 Via Pacifica Walk, Oxnard, Calif. 93030
Filed Apr. 24, 1985, Ser. No. 726,761
Term of patent 14 years
U.S. Cl. D9—439

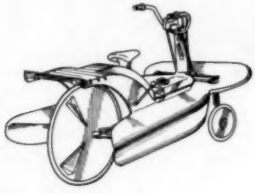


292,968
LIQUID CONTAINER
Richard C. Darr, Seville, Ohio, assignor to Plastipak Packaging, Inc., Plymouth, Mich.
Filed Mar. 14, 1985, Ser. No. 711,624
Term of patent 14 years
U.S. Cl. D9—370

292,969
BASEBALL LINE-UP BOARD
Russell W. Love, 25597 Margaret Ave., Moreno Valley, Calif. 92388
Filed Mar. 11, 1985, Ser. No. 710,410
Term of patent 14 years
U.S. Cl. D10—46.1

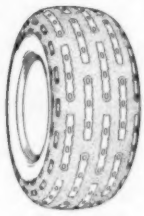


292,970
AMPHIBIAN BICYCLE
Masatsugu Takezono, Tokyo, Japan, assignor to Teiemu Giken Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 24, 1984, Ser. No. 664,144
Claims priority, application Japan, May 9, 1984, 59-18678
Term of patent 14 years
U.S. Cl. D12—3

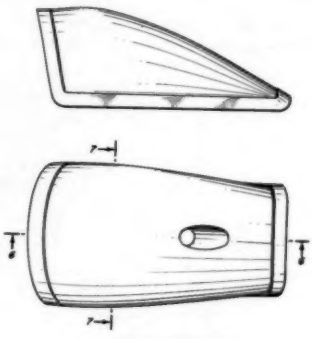


292,971
MONORAIL VEHICLE
Anton Frech, Weggis, and Georg Riser, Böckten, both of Switzerland, assignors to CWA Constructions SA, Olten, Switzerland
Filed Jan. 28, 1985, Ser. No. 695,844
Claims priority, application Switzerland, Jul. 31, 1984, 74259
Term of patent 14 years
U.S. Cl. D12—37

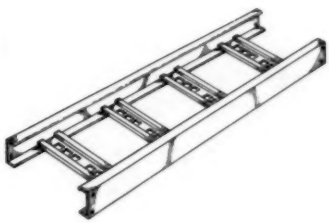
292,972
MOTORCYCLE TIRE
Hideaki Nishio, No. 31-12-509, Hon-cho, Wako-shi, Saitama, and Atsushi Tomura, No. 5-2-8, Nakazato, Kiyose-shi, Tokyo, both of Japan
Filed Jun. 6, 1985, Ser. No. 742,163
Claims priority, application Japan, Dec. 28, 1984, 59-53320
Term of patent 14 years
U.S. Cl. D12—136



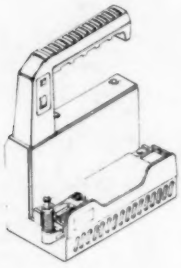
292,973
WETBIKE WATER INLET MANIFOLD
Chris L. Lessel, 15205 Raymer St., Van Nuys, Calif. 91405
Filed Jun. 27, 1986, Ser. No. 879,795
Term of patent 14 years
U.S. Cl. D12—317



292,974
CABLE TRAY
James M. Kenning; William K. McErlane, both of Cincinnati, Ohio, and Barry R. Schuster, Union, Ky., assignors to Square D Company, Palatine, Ill.
Filed Sep. 17, 1984, Ser. No. 651,506
Term of patent 14 years
U.S. Cl. D13—40

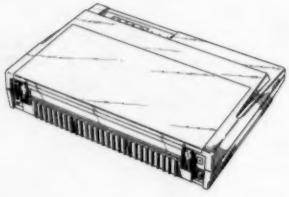


292,975
COMBINED CARRYING CASE AND BATTERY PACK FOR A CORDLESS TELEPHONE SET
Fumiyuki Kobayashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Feb. 26, 1986, Ser. No. 836,617
Claims priority, application Japan, Aug. 27, 1985, 60-36364
Term of patent 14 years
U.S. Cl. D14—65

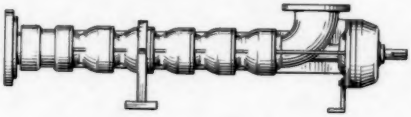


292,976
FACSIMILE
Masahiro Kando, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 22, 1985, Ser. No. 757,340
Claims priority, application Japan, Jan. 28, 1985, 60-2637
Term of patent 14 years
U.S. Cl. D14—94

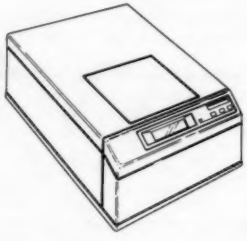
292,977
PRINTER
Haruo Ikeda, Sakado, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan
Filed Mar. 20, 1985, Ser. No. 713,682
Claims priority, application Japan, Sep. 25, 1984, 59-39362
Term of patent 14 years
U.S. Cl. D14—111



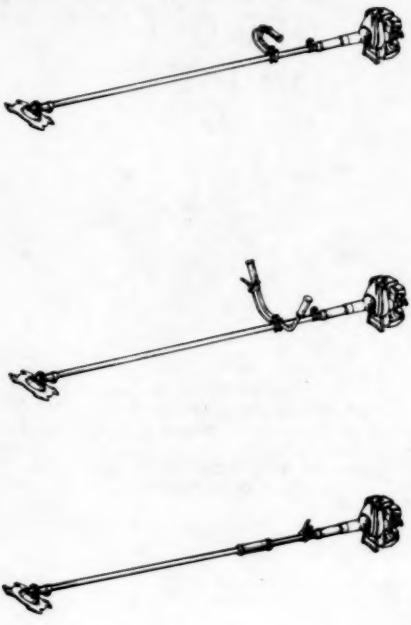
292,978
HORIZONTAL VARIABLE SPEED TURBINE PUMP
Donald J. Hansen, and Gary G. Read, both of Aurora, Ill., assignors to General Signal Corporation, Stamford, Conn.
Filed Aug. 23, 1985, Ser. No. 768,584
Term of patent 1 years
U.S. Cl. D15—7



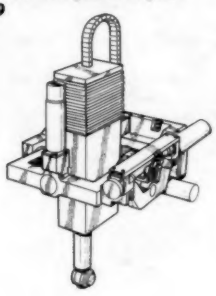
292,979
AUTOMATIC SEMICONDUCTOR WAFER TESTER
Marland Chow, San Jose, Calif., assignor to Prometrix Corporation, Santa Clara, Calif.
Filed Apr. 26, 1985, Ser. No. 727,417
Term of patent 14 years
U.S. Cl. D10—75



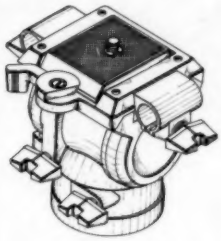
292,980
BUSH CUTTER
Hiroshi Tomita, and Hiroaki Hatano, both of Numazu, Japan, assignors to Fuji Robin Kabushiki Kaisha, Tokyo, Japan
Filed Mar. 11, 1985, Ser. No. 710,182
Term of patent 14 years
U.S. Cl. D15—16



292,981
ROBOT
Hans-Olov Skoog; Ulf J. Holmqvist, and Leif K. Telldén, all of Västerås, Fed. Rep. of Germany, assignors to ASEA AB, Västerås, Sweden
Filed Nov. 13, 1984, Ser. No. 670,966
Claims priority, application Sweden, May 18, 1984, 84-1560
Term of patent 14 years
U.S. Cl. D15—199



292,982
PAN HEAD ASSEMBLY
Koma Nakatani, Tokyo, Japan, assignor to Velbon International Corp., Torrance, Calif.
Filed Aug. 23, 1984, Ser. No. 643,833
Term of patent 14 years
U.S. Cl. D16—46



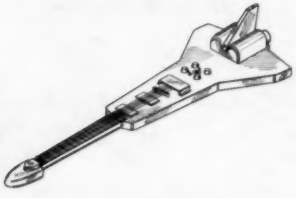
292,983
SPECTACLES
Joseph Kanoui, Geneva, Switzerland, assignor to Interdica S.A., Villars-sur-Glane, Switzerland
Filed Dec. 17, 1985, Ser. No. 810,052
Claims priority, application Hague, Jun. 17, 1985, DM/005413
Term of patent 14 years
U.S. Cl. D16—102

292,984
SUN GLASSES
Robert Sonthonnax, Marchon, Oyonnax, France (01100)
Filed Jul. 29, 1986, Ser. No. 890,309
Term of patent 14 years
U.S. Cl. D16—102

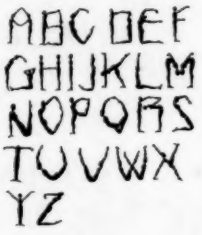
292,985
SPECTACLES
Masaki Hanagata, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan
Filed Apr. 10, 1985, Ser. No. 721,641
Claims priority, application Japan, Oct. 22, 1984, 59-43575
Term of patent 14 years
U.S. Cl. D16—102

292,986
CANINE SPECTACLES
Terry J. Magestro, 3755 S. Pennsylvania Ave., Milwaukee, Wis. 53207
Filed Oct. 18, 1984, Ser. No. 663,474
Term of patent 14 years
U.S. Cl. D16—107

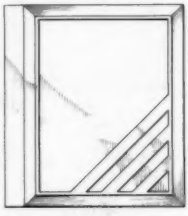
292,987
ELECTRICAL GUITAR
Frederick C. Johnson, Jr., 10550 Pepper Brook La., San Diego, Calif. 92131
Filed Mar. 21, 1985, Ser. No. 714,563
Term of patent 14 years
U.S. Cl. D17—18



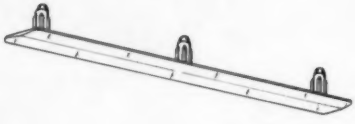
292,988
TYPEFACE
Jill A. Karlin, 20 Old Farm Rd., Newton Centre, Mass. 02159
Filed Jul. 2, 1985, Ser. No. 751,052
Term of patent 14 years
U.S. Cl. D18—27



292,989
PHOTOGRAPH ALBUM COVER
Steven J. Gordon, Boston, Mass., assignor to Melannco International Ltd., Chelsea, Mass.
Filed Jul. 23, 1984, Ser. No. 633,497
Term of patent 14 years
U.S. Cl. D19—26

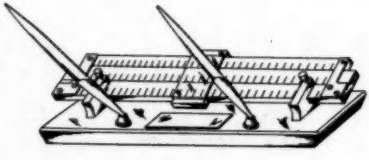


292,990
LABEL HOLDER ATTACHMENT FOR THE BACK OF A BINDER
Erik Eliasson, Gislaved, Sweden, assignor to Tage & Soner Byggnadsfirma AB, Sweden
Filed Apr. 26, 1985, Ser. No. 727,419
Claims priority, application Sweden, Nov. 7, 1984, 84-2966
Term of patent 14 years
U.S. Cl. D19—32

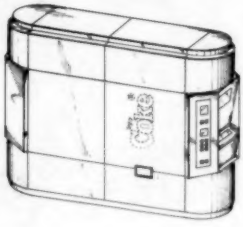


292,991
DESK CADDY
Herbert Adler, Nassau County, N.Y., assignor to Crest Industries Corp., Deer Park, N.Y.
Filed Aug. 22, 1986, Ser. No. 899,500
Term of patent 14 years
U.S. Cl. D19—78

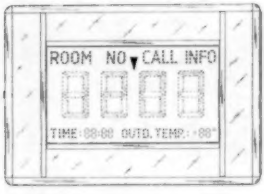
292,992
DESK SET
Jack F. Staley, 1304 Cardinal Dr., Warsaw, Ind. 46580
Filed Apr. 5, 1985, Ser. No. 720,385
Term of patent 14 years
U.S. Cl. D19—75



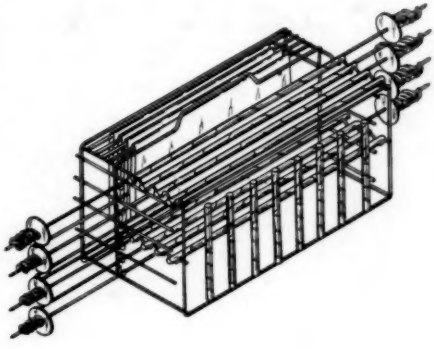
292,993
ISLAND VENDING MACHINE
Annis R. Morgan, Jr.; Eddie W. King; J. Henry Brandes, all of Atlanta, and James N. Letters, Mableton, all of Ga., assignors to The Coca-Cola Company, Atlanta, Ga.
Continuation-in-part of Ser. No. 309,470, Oct. 7, 1981. This application Apr. 5, 1984, Ser. No. 596,997
Term of patent 14 years
U.S. Cl. D20—5



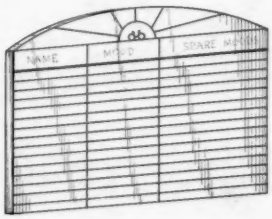
292,994
ANNUNCIATOR
Bengt L. Lindberg, Bangatan 24-30E, 41463 Göteborg, Sweden
Filed Aug. 29, 1984, Ser. No. 645,294
Term of patent 14 years
U.S. Cl. D20—20



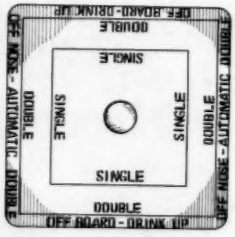
292,995
REAL ESTATE SIGN SYSTEM AND CARRIER THEREFOR
Joseph P. Valento, 9159 Dinsdale St., Downey, Calif. 90240
Filed Dec. 20, 1984, Ser. No. 684,095
Term of patent 14 years
U.S. Cl. D20—10



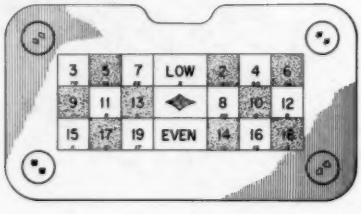
292,996
SIGN
Olga B. Gibb, 5731 W. 92nd Ave. #136, Westminster, Colo. 80030
Filed Mar. 16, 1984, Ser. No. 590,492
Term of patent 14 years
U.S. Cl. D20—42



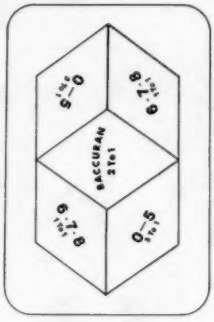
292,997
COIN TOSSING GAMEBOARD TARGET
Ronald P. Stewart, 172 E. Cove Ave., Wheeling, W. Va. 26003
Filed Jul. 16, 1984, Ser. No. 631,306
Term of patent 14 years
U.S. Cl. D21—5



292,998
GAMES SHEET
Brian Curran, 7 Sleeth Avenue, Dandenong, Victoria 3175, Australia
Filed Dec. 11, 1984, Ser. No. 680,482
Claims priority, application Australia, Jun. 28, 1984, 7974/84
Term of patent 14 years
U.S. Cl. D21—37

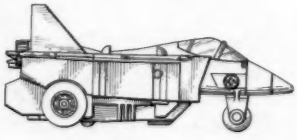


292,999
GAMES SHEET
Brian Curran, 7 Sleeth Avenue, Dandenong, Victoria 3175, Australia
Filed Dec. 11, 1984, Ser. No. 680,483
Claims priority, application Australia, Jun. 28, 1984, 7974/84
Term of patent 14 years
U.S. Cl. D21—37



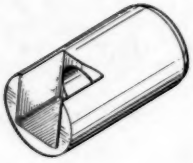
293,000
RATTLE BIRD TOY
D. Michael Williams, New York, and Lois E. Kelly, Brooklyn, both of N.Y., assignors to Johnson & Johnson Baby Products Company, New Brunswick, N.J.
Filed Feb. 8, 1985, Ser. No. 699,626
Term of patent 14 years
U.S. Cl. D21—65

293,001
TOY VEHICLE
Tatsuya Suzuki, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 6, 1985, Ser. No. 803,896
Claims priority, application Japan, May 17, 1985, 60-20437
Term of patent 14 years
U.S. Cl. D21—87



293,002
TOY VEHICLE
Hiroshi Ohkawa, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 6, 1985, Ser. No. 803,913
Claims priority, application Japan, May 17, 1985, 60-20436
Term of patent 14 years
U.S. Cl. D21—87

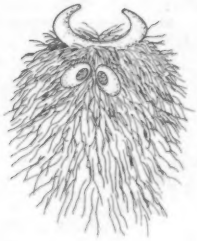
293,003
THRUST BEARING FOR WHEEL STRUTS OF MODEL AIRPLANES
Mark E. Larkin, 419 Northgate, Lindenhurst, Ill. 60046; Walter T. Szempruch, 4172 Dorchester Ave., Gurnee, Ill. 60031, and Stephen C. Yeaton, 151 Magnolia, Lindenhurst, Ill. 60046
Filed Oct. 15, 1984, Ser. No. 660,933
Term of patent 14 years
U.S. Cl. D21—91



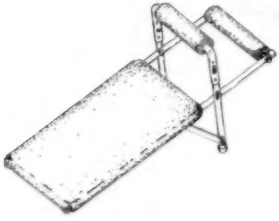
293,004
CHILD'S TOY
Norman R. Emms, Welwyn Garden City, England, assignor to Hestair Kiddicraft Limited, Surrey, England
Filed Oct. 3, 1984, Ser. No. 657,337
Claims priority, application United Kingdom, Jul. 4, 1984, 1020718
Term of patent 14 years
U.S. Cl. D21—158

293,005
TOY BIRD FIGURE
Jeffrey L. Peyton, P.O. Box C-32000, Richmond, Va. 23261
Filed Apr. 22, 1985, Ser. No. 725,747
Term of patent 14 years
U.S. Cl. D21—160

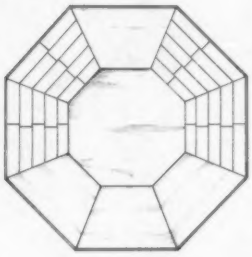
293,006
TOY FIGURE
Julie Monroe, 409 Pinecrest Dr., Warner Robins, Ga. 31093
Filed Feb. 25, 1985, Ser. No. 705,384
Term of patent 14 years
U.S. Cl. D21—168



293,007
SLANT BOARD OR SIMILAR ARTICLE
Millie Dittig, 914 Logan Rd., Bethel Park, Pa. 15102
Filed Aug. 12, 1985, Ser. No. 764,330
Term of patent 14 years
U.S. Cl. D21—191



293,008
OCTAGONAL BALL COURT
Thomas Muller, 46 Mohawk Ave., Rockaway, N.J. 07866
Filed Oct. 15, 1984, Ser. No. 661,215
Term of patent 14 years
U.S. Cl. D21—199

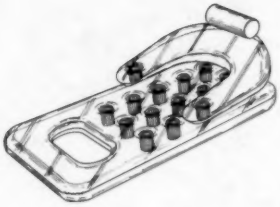


293,009
STARTING-BLOCK
Esa Pieniniemi, Jalohaukantie 6 E 21, SF-90250 Oulu 25, Finland
Filed Nov. 15, 1984, Ser. No. 671,784
Claims priority, application Finland, May 17, 1984, 517/84
Term of patent 14 years
U.S. Cl. D21—199

293,010
SKI COASTER
Laurent R. Fortin, 6 - 28 Albanel Street, Hull, Quebec, Canada (J8Z 1P9)
Filed Nov. 1, 1985, Ser. No. 793,758
Claims priority, application Canada, Oct. 29, 1985, 29-10-85-3
Term of patent 14 years
U.S. Cl. D21—227

293,011
TIGER FLOAT
Henry S. Wolfe, 14480 62nd St. North, Clearwater, Fla. 33520
Filed Oct. 18, 1985, Ser. No. 789,030
The portion of the term of this patent subsequent to Sep. 1, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D21—237

293,012
POOL LOUNGER
William R. Storey, Sunnyvale, and Leon H. Tager, San Carlos, both of Calif., assignors to Poolmaster, Inc., Menlo Park, Calif.
Filed Oct. 10, 1985, Ser. No. 785,971
Term of patent 14 years
U.S. Cl. D21—237

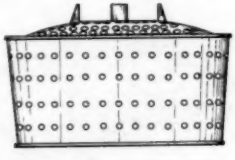


293,013
KNIFE
James L. Manniso, #5 Woodsman Dr., and Glenn R. Voshell, 339 Possum Park Rd., both of Newark, Del. 19711
Filed Feb. 19, 1985, Ser. No. 703,114
Term of patent 14 years
U.S. Cl. D22—118

293,014
INSECT LIGHT
Kathleen A. Davis, 6749 Tads Ct., Lisle, Ill. 60532
Filed Jul. 10, 1984, Ser. No. 629,507
Term of patent 14 years
U.S. Cl. D22—123

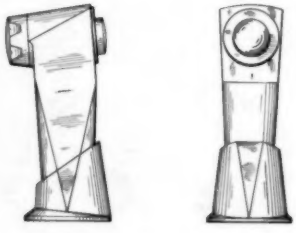
293,015
FISHING LURE
Hugh G. Shearer, 1645 Pin Oak Ct., Rose Hill, Kans. 67133
Filed Apr. 22, 1985, Ser. No. 725,485
Term of patent 14 years
U.S. Cl. D22—129

293,016
FILTER FOR DISHWASHER
Dan F. Fisher, 4902 Hillside, Lincoln, Nebr. 68596
Filed Feb. 11, 1985, Ser. No. 700,091
Term of patent 14 years
U.S. Cl. D23—209



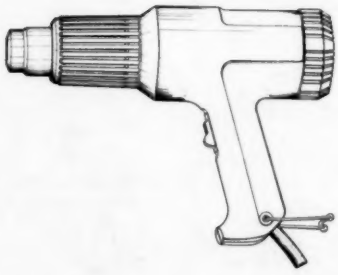
293,017
COLLAPSIBLE WATERING CAN OR SIMILAR ARTICLE
C. Michael Janowitz, 446 E. 86th St., New York, N.Y. 10028
Filed Aug. 5, 1985, Ser. No. 762,257
Term of patent 14 years
U.S. Cl. D23—212

293,018
COMBINED SINK SPRAYER AND SUPPORT SLEEVE
John Rudelick, Milwaukee, Wis., assignor to Universal-Rundle Corporation, New Castle, Pa.
Filed Jul. 23, 1984, Ser. No. 633,469
Term of patent 14 years
U.S. Cl. D23—226

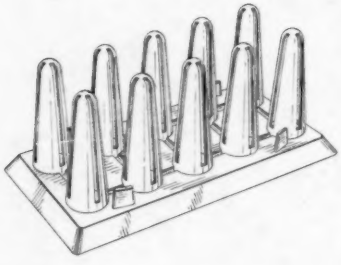


293,019
WATER-CLOSET
Knud Holscher, Virum, Denmark, assignor to IFO Sanitar AB, Bromolla, Sweden
Filed Jul. 10, 1984, Ser. No. 629,373
Term of patent 14 years
U.S. Cl. D23—301

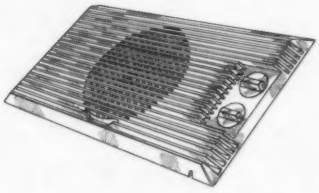
293,020
HOT AIR BLOWER
Heinrich W. Steinel, Herzebrock, and Jurgen Greubel, Heidenrad, both of Fed. Rep. of Germany, assignors to Steinel GmbH & Co KG, Fed. Rep. of Germany
Filed Nov. 2, 1983, Ser. No. 548,157
Claims priority, application Fed. Rep. of Germany, May 3, 1983, MR 1669
The portion of the term of this patent subsequent to Mar. 17, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—332



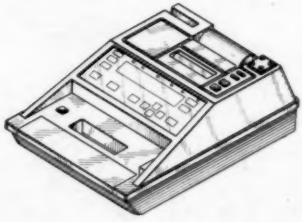
293,021
GARMENT DRYER OR SIMILAR ARTICLE
Lorne R. McCartney, 50 Jackson Court, Kanata, Ontario, Canada (K2K 1B7)
Continuation of Ser. No. 595,024, Mar. 30, 1984, Pat. No. 4,596,078. This application Apr. 4, 1986, Ser. No. 850,368
Term of patent 14 years
U.S. Cl. D32—6



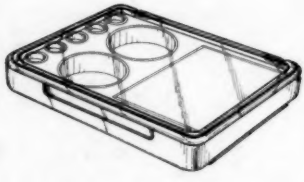
293,022
FRONT PANEL FOR AN AIR CONDITIONER
Richard H. Butcher, St Marys, Australia, assignor to F. F. Seeley Nominees Pty Ltd, St Marys, Australia
Filed Dec. 10, 1985, Ser. No. 807,273
Claims priority, application Australia, Jun. 18, 1985, 1591/85
Term of patent 14 years
U.S. Cl. D23—354



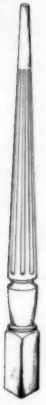
293,023
CARDIAC PACER ANALYZER
Joel F. Giurtino, Miami, Fla., assignor to Cordis Corporation, Miami, Fla.
Filed May 21, 1985, Ser. No. 736,631
Term of patent 14 years
U.S. Cl. D24—17



293,024
COMPARTMENTED PACKAGING CONTAINER FOR DENTAL MATERIALS OR THE LIKE
Robert D. Holewinski, Lakehurst, and Leslie Hamilton, Trenton, both of N.J., assignors to Johnson & Johnson Dental Products, Company, East Windsor, N.J.
Filed May 8, 1985, Ser. No. 731,706
Term of patent 14 years
U.S. Cl. D24—31



293,025
BALUSTER
John B. Noyce, Roswell, Ga., assignor to Manufacturers Merchandising Corp., Roswell, Ga.
Filed Nov. 16, 1984, Ser. No. 672,074
Term of patent 14 years
U.S. Cl. D25—129



293,026
LAMP
Haim Shwisha, Westport, Conn., assignor to Electrix, Inc., New Haven, Conn.
Filed Jun. 27, 1985, Ser. No. 749,204
Term of patent 14 years
U.S. Cl. D26—24

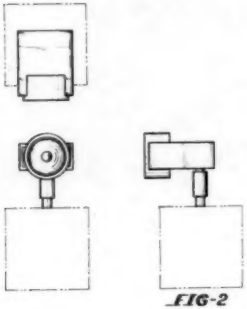
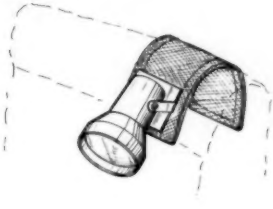


FIG-2

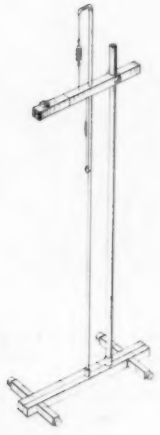
293,027
FLASHLIGHT
Donald W. Zurwelle, Lutherville, Md., assignor to Black & Decker Inc., Newark, Del.
Continuation-in-part of Ser. No. 574,731, Jan. 30, 1984, Pat. No. Des. 281,818. This application May 17, 1985, Ser. No. 735,115
Term of patent 14 years
U.S. Cl. D26—46

293,028
COMBINATION NIGHT LIGHT AND BANK
Lawrence E. Yother, and Douglas E. Tuckker, both of 4516 S. 26th, Forthsmith, Ark. 72901
Filed Jul. 19, 1985, Ser. No. 756,643
Term of patent 14 years
U.S. Cl. D26—51

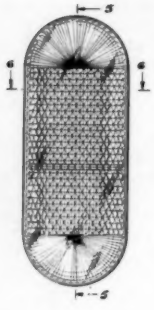
293,029
PORTABLE READING LAMP
Haim Shwisha, Westport, Conn., assignor to Electrix, Inc., New Haven, Conn.
Filed Jun. 27, 1985, Ser. No. 749,526
Term of patent 14 years
U.S. Cl. D26—60



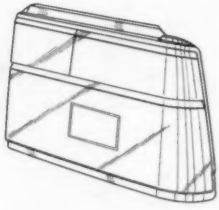
293,030
LAMP OR SIMILAR ARTICLE
Stefan Vladescu, 73-12 35th Ave., Apt. B43, Jackson Heights, N.Y. 11373
Filed Nov. 26, 1985, Ser. No. 802,151
Term of patent 14 years
U.S. Cl. D26—107



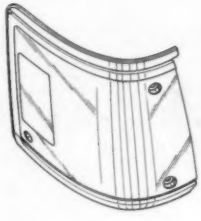
293,031
DIFFUSER FOR A NIGHTLIGHT
Frederic W. Schwartz, Providence, R.I., assignor to Cable Electric Products, Inc., Providence, R.I.
Filed Jul. 22, 1985, Ser. No. 757,221
Term of patent 14 years
U.S. Cl. D26—118



293,032
REAR COMBINATION LAMP FOR AN AUTOMOBILE
Shinichi Hiranaka, Toyota, Japan, assignor to Toyoda Jidosha Kabushiki Kaisha, Toyota, Japan
Filed May 30, 1985, Ser. No. 739,456
Term of patent 14 years
U.S. Cl. D26—120



293,033
CLEARANCE LAMP FOR AN AUTOMOBILE
Shinichi Hiranaka, Toyota, Japan, assignor to Toyoda Jidosha Kabushiki Kaisha, Toyota, Japan
Filed May 30, 1985, Ser. No. 739,459
Term of patent 14 years
U.S. Cl. D26—120

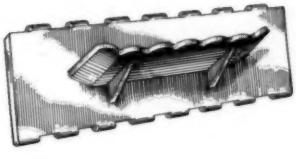


293,034
APPLICATOR CONTAINER
Doris duCret, New York, N.Y., assignor to Bristol-Myers Company, New York, N.Y.
Filed Jan. 6, 1984, Ser. No. 568,752
Term of patent 14 years
U.S. Cl. D28—7

293,035
COMBINED MULTIPLE MASCARA DISPENSER AND APPLICATOR
Jennifer J. Osborne, Lot 6 Monitor Village, Centreville, Iowa 52544
Filed Feb. 21, 1985, Ser. No. 703,866
Term of patent 14 years
U.S. Cl. D28—7

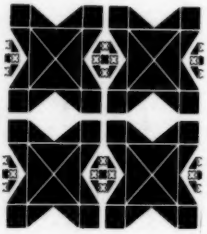
293,036
SAFETY RAZOR HANDLE
Clemens A. Iten, Staunton, Va., and David O. Chase, Skaneateles, N.Y., assignors to American Safety Razor Company, Verona, Va.
Filed May 25, 1984, Ser. No. 614,133
Term of patent 14 years
U.S. Cl. D28—48

293,037
CONVEYOR CLEAT
Ross Capawana, 3250 Pollux Ave., Las Vegas, Nev. 89102
Filed Mar. 5, 1985, Ser. No. 708,411
Term of patent 14 years
U.S. Cl. D34—35



293,038
REFUSE RECEPTACLE
Joseph Kepiro, 810 Waterfront Dr., Lancaster, Pa. 17602
Filed Aug. 26, 1985, Ser. No. 769,315
Term of patent 14 years
U.S. Cl. D34—7

293,039
PLASTIC SHEET MATERIAL FOR A POOL LINER
D. Stuart Beattie, Ontario, Canada, assignor to Fox Pool Corporation, York, Pa.
Filed Jan. 28, 1985, Ser. No. 695,778
Term of patent 14 years
U.S. Cl. D5—61



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aardvark Audio Inc.: *See*—
Rutt, Thomas E., 4,710,727, Cl. 330-110.000.

Aarons, Louis. Dichotic-diotic paired-association for learning of verbal materials. 4,710,130, Cl. 434-157.000.

AB Electrolux: *See*—
Axelson, Claes J. H., 4,710,611, Cl. 219-450.000.

Abe, Kunihisa: *See*—
Tonoki, Satoshi; Tsunemi, Hidenari; Nishimura, Asaichi; and Abe, Kunihisa, 4,710,420, Cl. 428-212.000.

Abe, Sanae: *See*—
Sato, Noboru; Habu, Kazutaka; and Abe, Sanae, 4,710,434, Cl. 428-678.000.

Abo, Toshimi: *See*—
Ueno, Takashi; and Abo, Toshimi, 4,709,553, Cl. 60-602.000.

Abou-Gharbia, Magid A.; and Nielsen, Susan T., to American Home Products Corporation. Histamine H1antagonists. 4,710,572, Cl. 544-267.000.

Ackermann, Rolf, to Ta Triumph-Adler Aktiengesellschaft. Ribbon cassette with end of ribbon detector. 4,710,044, Cl. 400-208.000.

Acla, Howard L.: *See*—
Ritsko, Joseph E.; and Acla, Howard L., 4,710,368, Cl. 423-344.000.

Acme Electric Corporation: *See*—
Sutphin, Richard C.; Bell, Steven R.; and Monsell, Kurt, 4,710,694, Cl. 320-21.000.

ACME P.W. Lenzen GbmH & Co. KG: *See*—
Staszko, Wladyslaw, 4,709,627, Cl. 100-30.000.

Adachi, Motoyuki: *See*—
Kohashi, Toru; and Adachi, Motoyuki, 4,709,770, Cl. 177-50.000.

Adamek, Frank C.; and Bridges, Charles D., to Vetco Gray Inc. Temperature transient resistant seal. 4,709,933, Cl. 277-167.500.

Adamski, Alfred; DeFranco, Thomas P.; and Dougherty, Lawrence W., to Zenith Electronics Corporation. Internal electrical connector for a tension mask tube. 4,710,669, Cl. 313-402.000.

ADC Telecommunications, Inc.: *See*—
Bradley, James D.; and Pfeffer, George B., 4,710,138, Cl. 439-581.000.

Adell, Robert, to U.S. Product Development Company. Molding for automobile body panels, such as doors. 4,709,525, Cl. 52-718.100.

Adolphi, Heinrich: *See*—
Buerstinghaus, Rainer; and Adolphi, Heinrich, 4,710,494, Cl. 514-143.000.

Advance Machine Company: *See*—
Sletten, William C., II, 4,709,442, Cl. 15-320.000.

Advanced Micro Devices, Inc.: *See*—
Duley, Raymond S.; and Forth, Leslie, 4,710,943, Cl. 375-7.000.
Liu, Yow-Juang (Bill), 4,709,467, Cl. 437-30.000.
Scott, Paul H., 4,710,922, Cl. 370-112.000.

Advanced Separation Technologies Incorporated: *See*—
Berry, W. Wes, 4,710,364, Cl. 423-244.000.

Advanced Tool Technology, Inc.: *See*—
Rossetti, James J., 4,710,334, Cl. 264-102.000.

Advantest Corporation: *See*—
Ando, Masakazu, 4,710,704, Cl. 324-73.00R.

Aerospatiale Societe Nationale Industrielle: *See*—
Grenier, Gilles; Maffert, Jerome; Merle, Jean-Pierre; and des Ordons, Jacques R., 4,710,028, Cl. 356-375.000.
Moutardier, Jacques, 4,709,586, Cl. 74-5.120.

Agence Spatiale Europeenne: *See*—
Roederer, Antoine G.; Doro, Guilio; and Lisi, Marco, 4,710,776, Cl. 343-778.000.

Agency of Industrial Science & Technology: *See*—
Nakano, Kikuo; and Hayashi, Hiroshi, 4,710,435, Cl. 428-698.000.

Ageno, Yuzo: *See*—
Shimoda, Kaneyasu; Katoh, Tadayoshi; and Ageno, Yuzo, 4,710,746, Cl. 340-347.0DD.

AGFA-Gevaert N.V.: *See*—
Leenders, Luc H.; Daems, Eddie R.; and Van den Bogaert, Jan A., 4,710,444, Cl. 430-237.000.
Ooms, Richard A., 4,710,451, Cl. 430-441.000.

AGI Incorporated: *See*—
Kosterka, Donald W., 4,709,812, Cl. 206-310.000.

Ahmed, Hassan J.: *See*—
Parker, Merle A.; Pregnall, Richard A.; and Ahmed, Hassan J., 4,709,579, Cl. 73-76.000.

Ahmed, Moustafa E. Device for the programmed teaching of arabic language and recitations. 4,710,877, Cl. 364-419.000.

Ahuja, Om, to Om Electronics Systems Corp. Telephone line fault locating device. 4,710,949, Cl. 379-26.000.

Aiba, Mitsuru: *See*—
Suzuki, Hideo; Okamoto, Kunihide; Hayashi, Yasuyuki; and Aiba, Mitsuru, 4,709,934, Cl. 280-6.00R.

Air-O-Lator Corporation: *See*—
Cramer, Barry G.; and Cramer, Roy A., 4,710,325, Cl. 261-24.000.

Aisaka, Kazuo: *See*—
Uwajima, Takayuki; and Aisaka, Kazuo, 4,710,470, Cl. 435-200.000.

Aisin Seiki Kabushika Kaisha: *See*—
Kazaoka, Kenichi; and Okazaki, Hiroshi, 4,709,965, Cl. 297-366.000.

Aisin-Warner Limited: *See*—
Sakakibara, Shiro; and Ozaki, Kazuhisa, 4,709,793, Cl. 192-4.00A.

Aivaliotis, Emmanuel: *See*—
McKee, Bobby D.; Cain, Michael P.; Delvecchio, Robert M.; and Aivaliotis, Emmanuel, 4,710,660, Cl. 310-178.000.

Akanabe, Yuichi: *See*—
Funaki, Shinsuke; Akanabe, Yuichi; and Ikeda, Hiroaki, 4,710,779, Cl. 346-1.100.

Akao, Takeshi; and Furukawa, Toshio, to Kikkoman Corporation. Method for processing by heating and equipment for same. 4,709,487, Cl. 34-10.000.

Akasaki, Hidehiko: *See*—
Kojima, Haruo; and Akasaki, Hidehiko, 4,710,250, Cl. 156-89.000.

Akashi Seisakusho Ltd.: *See*—
Suzuki, Shigeru, 4,710,633, Cl. 250-442.100.

Akiyama, Masashi; and Tagashira, Yasuo, to Kusakabe Electric & Machinery Co. Ltd. Apparatus for continuously producing steel pipes including using rotable beds of tools for different size pipe. 4,709,845, Cl. 228-17.000.

Akiyama, Tatsuo: *See*—
Koshino, Yutaka; Akiyama, Tatsuo; and Baba, Yoshiro, 4,710,794, Cl. 357-49.000.

Akzo NV: *See*—
Guioth, Chantal H.; Maze, Etienne G.; and Rabajoie, Loick P., 4,710,281, Cl. 204-181.700.

Albany International Corporation: *See*—
Coplan, Myron J., 4,709,831, Cl. 220-304.000.

Alcan International Limited: *See*—
Bryson, Neil B.; Auchterlonie, David T. T.; LeBlanc, Guy; and Newberry, Vincent J., 4,709,744, Cl. 164-472.000.

Aldrich, Dale J.: *See*—
Bogan, Gary W.; Lucas, Peter A.; Monnerat, Georgia A.; and Aldrich, Dale J., 4,710,429, Cl. 428-417.000.

Alexander, William, to American Colloid Company. Production process for manufacturing low molecular weight water soluble acrylic polymers as drilling fluid additives. 4,709,767, Cl. 175-65.000.

Alfa-Laval AB: *See*—
Klintenstedt, Kjell; Foldhazy, Zoltan; and Forsberg, Bjorn, 4,710,160, Cl. 494-64.000.

Alfa-Laval Separation AB: *See*—
Gullers, Per, 4,710,159, Cl. 494-27.000.

Alfred Karcher GmbH & Co.: *See*—
Schulze, Werner; and Gerich, Josef, 4,709,859, Cl. 239-525.000.

Alfred Teves GmbH: *See*—
Czich, Erhard; Drott, Peter; and Haefner, Horst, 4,709,789, Cl. 188-73.440.
Saalbach, Kurt; and Hartmann, Willi, 4,709,551, Cl. 60-589.000.

Algrim, Donald J.: *See*—
Broderick, Thomas B.; Algrim, Donald J.; and Hayden, Richard F., 4,709,523, Cl. 52-406.000.

Alleman, Raymond A.: *See*—
Raush, Russell G.; and Alleman, Raymond A., 4,709,716, Cl. 134-122.00R.

Allen Engineering Corporation: *See*—
Allen, J. Dewayne, 4,710,054, Cl. 404-110.000.

Allen, J. Dewayne, to Allen Engineering Corporation. Material spreader system. 4,710,054, Cl. 404-110.000.

Allen, Richard A. Universal folding carrier. 4,709,840, Cl. 224-314.000.

Allen, Ronald C.; and Sajur, Eugene V. Atmosphere controlling process for food storage. 4,710,206, Cl. 55-58.000.

Allert, Kurt. Link chain. 4,710,153, Cl. 474-211.000.

Allied Corporation: *See*—
Anderson, Philip M., III; and Urbanski, Jeffrey C., 4,710,709, Cl. 324-207.000.
Boyle, William J., Jr.; Mares, Frank; and Corbo, Andrea M., 4,710,545, Cl. 525-340.000.

Allison, Joe D.; and Wimberley, J. W., to Conoco Inc. Processes and oxidizing agents for oxidizing sulfide ion to innocuous, soluble sulfur species. 4,710,305, Cl. 210-747.000.

Alpha Enterprises, Inc.: *See*—
Hehn, Bruce A.; and Sankey, James K., 4,709,437, Cl. 15-97.00R.

Alphair Ventilating Systems Inc.: *See*—
Martens, Ernst, 4,710,112, Cl. 425-64.000.

Alpine Electronics Inc.: *See*—
Ejiri, Kazushige, 4,710,910, Cl. 369-75.200.

194-256 O.G.-87-19

Alps Electric Co., Ltd.: *See*—
Hishi, Yuichi, 4,710,836, Cl. 360-106.000.
Kato, Masakazu, 4,710,263, Cl. 156-637.000.
Kimura, Kiyoshi, 4,710,595, Cl. 178-18.000.
Sasaki, Shinji; Shimoyama, Yujiro; and Watanabe, Yoshinori, 4,710,600, Cl. 200-291.000.
Shimaoka, Motohiro; and Saito, Yukio, 4,710,829, Cl. 360-97.000.
Suzuki, Takeo, 4,710,973, Cl. 455-180.000.

Alps Electric, Ltd.: *See*—
Matsuta, Shigetoshi, 4,710,737, Cl. 334-56.000.

Alsen, Per; and Salo, Timo, to Erix Tool AB. Device in back spot facing tools. 4,710,070, Cl. 408-93.000.

Alstetter, Franz; and Hultsch, Guenther, to Krauss-Maffei A.G. Apparatus to accelerate the transfer of material between two media reacting in a fluidized bed. 4,710,356, Cl. 422-140.000.

Alsthom: *See*—
Besanceney, Michel, 4,709,582, Cl. 73-622.000.
Condolios, Elie, 4,710,291, Cl. 210-199.000.

Alston, Lawrence E., to Polaroid Corporation. System and method for improving chrominance in video disc storage system. 4,710,824, Cl. 358-310.000.

Altenhofen, Jonathan M. Method and apparatus for monitoring environmental evapotranspiration. 4,709,585, Cl. 73-866.400.

Altmeyer, Werner; Jakobs, Ewald; and Meier, Friedrich, to TechnoARBED Deutschland GmbH. Device for the internal deburring of a pipe. 4,710,078, Cl. 409-233.000.

Alumax, Inc.: *See*—
Young, Kenneth P.; Tyler, Derek E.; Cheskis, Harvey P.; and Watson, W. Gary, 4,709,746, Cl. 164-485.000.

Aluminum Company of America: *See*—
Jacoby, John E.; Yu, Ho; and Ramser, Robert A., 4,709,740, Cl. 164-5.000.
Stemler, J. Robert; Klingensmith, James D.; Menzemer, Craig C.; Kulicki, John M.; and Theofanis, Nicholas D., 4,709,435, Cl. 14-73.000.
Yu, Ho; and Granger, Douglas A., 4,709,747, Cl. 164-487.000.

Alvarez, Robert; Lehmann, Leonard; and Strul, Bruno, to DigiRad Corporation. Apparatus and method for measuring light transmittance or reflectance. 4,710,624, Cl. 250-228.000.

AM General Corporation: *See*—
Goodell, Fred L.; and Ellison, Michael J., 4,709,738, Cl. 152-400.000.

Amco Industries, Inc.: *See*—
Sirota, Gabriel J., 4,709,953, Cl. 294-106.000.

American Colloid Company: *See*—
Alexander, William, 4,709,767, Cl. 175-65.000.

American Cyanamid Company: *See*—
Forgione, Peter S.; and Singh, Balwant, 4,710,542, Cl. 525-127.000.
Schenkel, Robert H.; Wong, Rosie B.; and Thammana, Pallaiah, 4,710,377, Cl. 424-88.000.
Wright, William B., Jr.; and Tomcufcik, Andrew S., 4,710,502, Cl. 514-259.000.

American Device Manufacturing Co.: *See*—
Zortman, Zedekiah Z., 4,709,950, Cl. 292-92.000.

American Home Products Corporation: *See*—
Abou-Gharbia, Magid A.; and Nielsen, Susan T., 4,710,572, Cl. 544-267.000.
McGregor, William H.; and Chang, Joseph Y., 4,710,580, Cl. 558-86.000.

American Home Products Corporation (Del.): *See*—
Wooley, Paul H., 4,710,511, Cl. 514-411.000.

American Sprayed-On Fibers, Inc.: *See*—
Miller, Dennis C., 4,710,309, Cl. 252-62.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Brown, Donald W.; Leth, James W.; and Vandendorpe, James E., 4,710,926, Cl. 371-9.000.
Debus, Walter, Jr.; Osborne, Thomas L.; and Siller, Curtis A., Jr., 4,710,891, Cl. 364-718.000.
Heisinger, Robert F., 4,710,846, Cl. 361-119.000.
Kapur, Rajan N.; and Szurkowski, Edward S., 4,710,761, Cl. 340-721.000.
Presby, Herman M., 4,710,605, Cl. 219-121.0LJ.
Shoji, Masakazu, 4,710,650, Cl. 307-452.000.

American Telephone and Telegraph Company AT&T Information Systems: *See*—
Doyle, Francis S.; and France, Randall W., 4,710,954, Cl. 379-427.000.

American Telephone and Telegraph Company, AT&T Information Systems Inc.: *See*—
Kasday, Leonard R., 4,710,760, Cl. 340-712.000.

American Telephone and Telegraph Company AT&T Technologies, Inc.: *See*—
Tardy, John, 4,710,697, Cl. 323-239.000.

American Television & Communications Corporation: *See*—
Rast, Robert M., 4,710,956, Cl. 380-20.000.

Ametek, Inc.: *See*—
Meyers, Peter V.; Liu, Chung-Heng; and Frey, Timothy J., 4,710,589, Cl. 136-258.0PC.

Amgen, Inc.: *See*—
Morris, Charles F., 4,710,473, Cl. 435-320.000.

Amiad: *See*—
Amit, Meir, 4,710,284, Cl. 209-17.000.

Amit, Meir, to Amiad. Cyclonic separator. 4,710,284, Cl. 209-17.000.

Amoco Corporation: *See*—
Hinch, Henry H.; Boyne, Gail E.; Daniels, David L.; and Kullmann, Eugene V., 4,710,946, Cl. 378-62.000.
Maresca, Louis M., 4,710,562, Cl. 528-125.000.
Stauffer, Richard D., 4,710,308, Cl. 252-42.700.

AMP Incorporated: *See*—
Aoyama, Kohji; and Noguchi, Masaro, 4,710,135, Cl. 439-354.000.
Korsunsky, Iosif, 4,710,134, Cl. 439-264.000.
Waters, Mark H.; and Whiteman, Robert N., Jr., 4,709,973, Cl. 439-78.000.

Ampferer, Herbert, to Dr. Ing.h.c.F. Porsche Aktiengesellschaft. Fastening arrangement of a cover hood at a cylinder head. 4,709,670, Cl. 123-195.00C.

Amstutz, Stanford R.; Eliscu, Mark; Lenart, Joseph M.; and Haselton, E. Fletcher, to GTE Laboratories Incorporated. Switching apparatus for burst-switching communications system. 4,710,916, Cl. 370-58.000.

Anacomp, Inc.: *See*—
Bergstrom, Donald J.; and Wolfer, Allan J., 4,710,691, Cl. 318-696.000.

Anders, Walter G.; Grosswiller, Leo J., Jr.; Lozier, Benjamin F.; and Rozlosnik, Alan J., to Diebold, Incorporated. Valve and blower apparatus for pneumatic tube system. 4,710,098, Cl. 415-149.00A.

Andersen, Arve, to Elopak A/S. Fluid flow nozzle. 4,709,836, Cl. 222-490.000.

Anderson, John A. Firearm. 4,709,617, Cl. 89-157.000.

Anderson, Philip M., III; and Urbanski, Jeffrey C., to Allied Corporation. Magnetomechanical transducers utilizing resonant frequency shifts to measure displacement of an object. 4,710,709, Cl. 324-207.000.

Andersson, Olle, to Verkstads AB Claes Johansson. Adjustable steering wheel shaft for vehicles. 4,709,592, Cl. 74-493.000.

Ando, Fumihiko, to Nippon Hoso Kyokai. Solid state image sensor. 4,710,817, Cl. 358-213.110.

Ando, Masakazu, to Advantest Corporation. IC test equipment. 4,710,704, Cl. 324-73.00R.

Andre Fantasies, Inc.: *See*—
Gettinger, Lillian, 4,709,420, Cl. 2-50.000.

Andreas Stihl: *See*—
Wissmann, Michael; Weber, Jurgen; and Nickel, Hans, 4,709,669, Cl. 123-149.00D.

Andrews, John R., to Fugitt, Cullen Wayne, a part interest. Boat seat bracket. 4,709,648, Cl. 114-363.000.

Andric, Milos D. Portable disposable insect trap. 4,709,504, Cl. 43-114.000.

Andus Corp.: *See*—
Ritchie, Ian T.; and Kittler, Wilfred C., 4,710,441, Cl. 430-62.000.

Angell, Cyril N. E., to Avon Industrial Polymers Limited. Sight correction attachment for respirators. 4,709,696, Cl. 128-201.120.

Angio Medical Corporation: *See*—
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,710,490, Cl. 514-25.000.

Anic, S.p.A.: *See*—
Dozzi, Giovanni; Della Fortuna, Giorgio; and Cucinella, Salvatore, 4,710,531, Cl. 524-239.000.

Anritsu Corporation: *See*—
Itaya, Hiroshi; and Saito, Goro, 4,710,702, Cl. 324-79.00R.

Anselmino, Jeffrey; and Slabbekoorn, Scott D., to Whirlpool Corporation. Venturi air vent for dishwasher. 4,709,488, Cl. 34-235.000.

Antonious, Anthony J. Rotatable club holder insert for a golf bag. 4,709,814, Cl. 206-315.300.

Anzai, Hideyuki: *See*—
Yamauchi, Yasuhisa; Asano, Masao; Anzai, Hideyuki; and Yasufuku, Yoshitaka, 4,710,427, Cl. 428-407.000.

Aoki, Masaaki: *See*—
Hanamura, Shoji; Aoki, Masaaki; and Masuhara, Toshiaki, 4,710,648, Cl. 307-443.000.

Aoki, Norio: *See*—
Matsuyama, Shigeru; Kanazaki, Mikio; Aoki, Norio; and Ishii, Akira, 4,709,993, Cl. 350-339.00F.

Aotsuka, Yasuo; Konishi, Masahiro; and Takahashi, Koji, to Fuji Photo Film Co., Ltd. Temperature compensation for a semiconductor light source used for exposure of light sensitive material. 4,710,631, Cl. 250-354.100.

Aoyama, Kohji; and Noguchi, Masaro, to AMP Incorporated. Electrical connector having integral latch means. 4,710,135, Cl. 439-354.000.

Appelbaum, Paul. Lock and cover device. 4,709,567, Cl. 70-455.000.

Appenzeller, Ernst, heir: *See*—
Appenzeller, Valentin, deceased; Appenzeller, Maria, heir; Appenzeller, Regine, heir; Pegels, Doris, heir; and Appenzeller, Ernst, heir, 4,709,629, Cl. 100-162.00B.

Appenzeller, Maria, heir: *See*—
Appenzeller, Valentin, deceased; Appenzeller, Maria, heir; Appenzeller, Regine, heir; Pegels, Doris, heir; and Appenzeller, Ernst, heir, 4,709,629, Cl. 100-162.00B.

Appenzeller, Regine, heir: *See*—
Appenzeller, Valentin, deceased; Appenzeller, Maria, heir; Appenzeller, Regine, heir; Pegels, Doris, heir; and Appenzeller, Ernst, heir, 4,709,629, Cl. 100-162.00B.

Appenzeller, Valentin, deceased; by Appenzeller, Maria, heir; by Appenzeller, Regine, heir; by Pegels, Doris, heir; and by Appenzeller, Ernst, heir, to Kusters, Eduard. Roll with pressure chamber for detection control. 4,709,629, Cl. 100-162.00B.

Applied Biology, Inc.: *See*—
Raabe, Austin B., 4,709,576, Cl. 73-40.50R.

Applied Power, Inc.: *See*—
Mierbach, Hans-Bernd; Frohn, Gustav K.; and Blockisch, Olaf, 4,709,600, Cl. 81-57.390.
Applied Precision Limited: *See*—
Lazorthes, Guy, 4,710,167, Cl. 604-93.000.
Aquarium Pharmaceuticals, Inc.: *See*—
Gothard, Patrick G., 4,709,657, Cl. 119-5.000.
Aracs, Zsuzsanna: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., to Raychem Limited. Fibre reinforced polymeric article. 4,709,948, Cl. 285-381.000.
Architectural Wall Systems, Inc.: *See*—
Mitchell, Terry L.; and Poortvliet, Robert J., 4,709,517, Cl. 52-36.000.
Arcoa Industries: *See*—
Tucker, Dalton R., 4,709,839, Cl. 223-119.000.
Arduengo, Anthony J., to Du Pont de Nemours, E. I., and Company. Thermochromic arsenic and antimony compounds. 4,710,576, Cl. 556-40.000.
Areaux, Larry D.; and Dudley, Robert H., to Pre-Melt Systems, Inc. Method and apparatus for drying metal chips. 4,710,126, Cl. 432-58.000.
Arends, Thomas C.: *See*—
Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., 4,710,917, Cl. 370-62.000.
Ariga, Keiki: *See*—
Iwasaki, Tadayoshi; Ariga, Keiki; and Sato, Makoto, 4,709,578, Cl. 73-49.300.
Arimoto, Kazutami: *See*—
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, 4,710,789, Cl. 357-23.600.
Aritake, Takeshi: *See*—
Tokairin, Hiroaki; Honma, Kazuo; Nakajima, Kichio; Nagasawa, Kiyoshi; and Aritake, Takeshi, 4,710,884, Cl. 364-513.000.
Arjomari-Prioux: *See*—
Camus, Michel, 4,710,614, Cl. 235-380.000.
Fredenucci, Pierre, 4,710,422, Cl. 428-248.000.
Armstrong World Industries, Inc.: *See*—
Davey, Raymond G.; Dees, Martin, Jr.; and Sigman, Daniel M., Jr., 4,709,631, Cl. 101-129.000.
Arntz-Optibelt-KG: *See*—
Borchardt, Horst, 4,710,251, Cl. 156-137.000.
ARS Edge Co. Ltd.: *See*—
Takigawa, Shigetsugu; and Takigawa, Masuhiko, 4,709,480, Cl. 30-254.000.
Asaeda, Takeaki, to Mitsubishi Denki Kabushiki Kaisha. Inverter. 4,710,862, Cl. 363-58.000.
Asai, Kohtaro: *See*—
Murakami, Tokumichi; Itoh, Atsushi; Asai, Kohtaro; Kamizawa, Koh; and Nishida, Masami, 4,710,812, Cl. 358-136.000.
Asano, Masao: *See*—
Yamauchi, Yasuhisa; Asano, Masao; Anzai, Hideyuki; and Yasufuku, Yoshitaka, 4,710,427, Cl. 428-407.000.
ASEA AB: *See*—
Skoog, Hans; Holmqvist, Ulf; and Tellden, Leif, 4,710,092, Cl. 414-729.000.
ASM Fico Tooling, b.v.: *See*—
Fierkens, Richardus H. J.; and Pas, Ireneus J. T. M., 4,710,094, Cl. 414-752.000.
Aspen Peripherals: *See*—
Smith, David E.; Olmsted, Dennis R.; and Fryberger, Joseph A., 4,709,873, Cl. 242-195.000.
Astley, Vivian C.; and Taravella, Jody J., to Freeport Minerals Company. Method for producing stabilized wet process phosphoric acid with low content of magnesium and aluminum. 4,710,366, Cl. 423-321.00R.
Atagi, Tanya A.: *See*—
Johnston, James H.; Hermann, George D.; and Atagi, Tanya A., 4,709,698, Cl. 128-303.120.
Atara Corporation: *See*—
DeVos, Jerry, 4,710,292, Cl. 210-218.000.
Atlantic Richfield Company: *See*—
Blair, Christon R.; and Parker, Kenneth B., 4,710,061, Cl. 405-195.000.
Withjack, Eric M., 4,710,948, Cl. 378-208.000.
Atsumi, Tomiaki: *See*—
Ichikawa, Noriyuki; Suzuki, Tetsushi; and Atsumi, Tomiaki, 4,710,152, Cl. 474-166.000.
Auchterlonie, David T. T.: *See*—
Bryson, Neil B.; Auchterlonie, David T. T.; LeBlanc, Guy; and Newberry, Vincent J., 4,709,744, Cl. 164-472.000.
Aufiero, James M., to Itek Corporation. Digital frame processor pipe line circuit. 4,710,966, Cl. 382-69.000.
Auger, Jean: *See*—
Behar, Francoise; Roucache, Jeannine; Auger, Jean; and Boudet, Luc, 4,710,354, Cl. 422-80.000.
Aulds, James M.; and Becker, Roger J., to United States of America, Air Force. Proportional drive servo controller with arrayed position detector. 4,710,641, Cl. 250-554.000.
Auracher, Franz, to Siemens Aktiengesellschaft. Controllable directional coupler. 4,709,977, Cl. 350-96.140.
Auschrat, Siegfried: *See*—
Segebrecht, Udo; and Auschrat, Siegfried, 4,710,105, Cl. 417-68.000.
Ausnit, Steven, to Minigrip, Inc. Method and apparatus for making reclosable bags in a form, fill and seal machine. 4,709,533, Cl. 53-451.000.
Austria Metall Aktiengesellschaft: *See*—
Scherzer, Wilhelm, 4,709,781, Cl. 181-290.000.
Autek Systems Corporation: *See*—
McCutcheon, Samuel; Lum, Jeffrey; Solek, Roman; Harrell, Troy; and Leman, Robert, 4,710,893, Cl. 364-900.000.
Automotive Products plc: *See*—
Cucinotta, Luigi; and Di Benedetto, Orazio, 4,709,797, Cl. 192-106.200.
Avco Corporation: *See*—
Tinti, Aldo A., 4,710,097, Cl. 415-138.000.
Avens, Larry R.: *See*—
FitzPatrick, John R.; Dunn, Jerry G.; and Avens, Larry R., 4,710,222, Cl. 75-84.10R.
Avon Industrial Polymers Limited: *See*—
Angell, Cyril N. E., 4,709,696, Cl. 128-201.120.
Axelson, Claes J. H., to AB Electrolux. Arrangement in a cooking plate or hob having a temperature sensor. 4,710,611, Cl. 219-450.000.
Axiuk, Oleg: *See*—
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., 4,710,594, Cl. 174-120.0SR.
B.A.T. Cigaretten-Fabriken GmbH: *See*—
Junemann, Gitta; Hirsch, Werner; and Weiss, Arno, 4,709,709, Cl. 131-306.000.
B. F. Goodrich Company, The: *See*—
Neuman, Richard C., 4,710,533, Cl. 524-394.000.
B & G Machinery Company: *See*—
Swiderski, Kevin J., 4,709,803, Cl. 198-468.200.
Baach, Michael K., to Corrpro Companies, Inc. Replaceable deep anode system. 4,710,644, Cl. 307-95.000.
Baba, Yoshiro: *See*—
Koshino, Yutaka; Akiyama, Tatsuo; and Baba, Yoshiro, 4,710,794, Cl. 357-49.000.
Babcock & Wilcox Company, The: *See*—
Flora, John H.; Womack, Robert E.; Stinnett, Carlton E.; and Dalton, Claude W., 4,710,710, Cl. 324-220.000.
Babitzka, Rudolf, to Robert Bosch GmbH. Fuel injection apparatus for internal combustion engines. 4,709,673, Cl. 123-299.000.
Bachl, Robert; Warzelhan, Volker; Schweier, Guenther; Gropper, Hans; and Ball, Wolfgang, to BASF Aktiengesellschaft. Preparation of homopolymers of ethene and copolymers of ethene with higher-α-monolefins using a Ziegler catalyst system. 4,710,552, Cl. 526-116.000.
Backman, Sune; and Hakanson, Hakan. Method of making filter paper. 4,710,402, Cl. 427-244.000.
Bagnall, Paul J. H.; and Whiteley, Norman, to Peerless Plastics Packaging Limited. Method of manufacturing a molded plastics article incorporating a blank of sheet. 4,710,338, Cl. 264-509.000.
Bahn, Itsuki; and Okada, Hideo, to Secoh Geiken Inc. Rotation detecting apparatus. 4,710,683, Cl. 318-254.000.
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, to Ruhrchemie Aktiengesellschaft. Quaternary ammonium salts of sulfonated triarylphosphines and process for the production thereof. 4,710,321, Cl. 200-501.150.
Bailey, George, to Hekimian Laboratories, Inc. Balanced mixer. 4,710,890, Cl. 364-703.000.
Bailey, Lorraine F.; and Bennett, Richard J., to Corning Glass Works. Bonding glass-ceramic dental products. 4,710,217, Cl. 65-31.000.
Baity, Donald N.; Schwandt, Gregory J.; and Kidwell, Charles E., to General Motors Corporation. Illuminated rocker switch assembly. 4,710,602, Cl. 200-315.000.
Baker Oil Tools, Inc.: *See*—
Preston, Dan C., Jr., 4,709,758, Cl. 166-120.000.
Bakos, Jozsef: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.
Baldoni, J. Gary, II; Buljan, Sergej-Tomislav; and Sarin, Vinod K., to GTE Laboratories Inc. Abrasion resistant articles and composition utilizing a boron-doped refractory particle. 4,710,425, Cl. 428-328.000.
Balduff, Dennis C.; and Jabarin, Saleh A., to Owens-Illinois Plastic Products Inc. Degradable polymer composition and articles prepared from same. 4,709,808, Cl. 206-158.000.
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., to Merck & Co., Inc. Antidepressant spiro hexahydro arylquinolizine derivatives, composition, and method of use therefor. 4,710,504, Cl. 514-267.000.
Bales, David W.: *See*—
Roth, James E.; and Bales, David W., 4,709,623, Cl. 98-40.050.
Balke, Roy L.; Merrifield, Charles H.; and Mizikowski, Frank E., to General Electric Company. Dynamoelectric machine rotor structure having improved insulation. 4,710,662, Cl. 310-204.000.
Ball, Wolfgang: *See*—
Bachl, Robert; Warzelhan, Volker; Schweier, Guenther; Gropper, Hans; and Ball, Wolfgang, 4,710,552, Cl. 526-116.000.
Ballestrazzi, Aris; and Tassi, Lamberto, to Sitma Societa Italiana Macchine Automatiche S.p.A. Centralized drive device in a packaging machine. 4,709,530, Cl. 53-209.000.

Ballestrazzi, Aris; and Tassi, Lamberto, to Sitma- Societa Italiana Macchine Automatiche S.p.A. Longitudinal welding equipment in a packer machine. 4,709,537, Cl. 53-550.000.

Ballu, Patrick J. M., to Tecnoma. Diaphragm pumps with improved structural cooling and maintenance. 4,710,109, Cl. 417-454.000.

Baltes, Heinrich P.; and Huiser, Andre M. J., to Lgz Landis & Gyr Zug AG. Method and an apparatus for determining the genuineness of a security blank. 4,710,627, Cl. 250-339.000.

Bandara, Upali; Hinkel, Holger; Steiner, Werner; and Trippel, Gerhard, to International Business Machines Corporation. Magnetic disk and method of making same. 4,710,424, Cl. 428-325.000.

Bando Chemical Industries, Inc.: *See*—
Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, 4,710,255, Cl. 156-361.000.

Bando Chemical Industries, Lt.: *See*—
Matsuoka, Hiroshi; and Onoe, Susumu, 4,710,155, Cl. 474-260.000.

Banno, Haruhiko; and Yatagai, Shigeo, to Kabushiki Kaisha Toshiba. Computer image display apparatus. 4,710,771, Cl. 340-811.000.

Barbaglia, Joseph C.: *See*—
Wilson, Richard A.; and Barbaglia, Joseph C., 4,709,924, Cl. 273-26.00R.

Barnard, Andrew A.: *See*—
Stevens, Leonard W.; Siwik, William S.; Moore, William A.; Brown, Wayne M.; and Barnard, Andrew A., 4,709,545, Cl. 60-39.080.

Barnes, Austen B. Axial locking device. 4,709,454, Cl. 24-590.000.

Barnes, Hugh V., to TI Gas Spares Limited. Gas cookers. 4,709,687, Cl. 126-42.000.

Barnett, Earl D., to Chicago Show Printing Co. Support bracket for signs and advertising displays. 4,709,891, Cl. 248-214.000.

Barouh, Victor; and Dinsky, Seth. Desk-top correction ribbon system. 4,710,047, Cl. 400-697.000.

Barr, Dallas N.: *See*—
Sluss, Elmer C.; Nettleton, John E.; and Barr, Dallas N., 4,710,941, Cl. 372-87.000.

Barrick, Fred A. Combination device for applying tire chains and mounting a jack. 4,709,432, Cl. 7-100.000.

Barry, Michael W.: *See*—
Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., 4,710,917, Cl. 370-62.000.

Barth, Russell W.; and Buess, Ronald P., to Uni-Grip, Inc. Core structure for use in a seal. 4,710,416, Cl. 428-119.000.

Barthel, Walter: *See*—
Muller, Karl H.; and Barthel, Walter, 4,710,229, Cl. 106-281.00R.

Bartholomaus, Reiner; and Widmann, Karlheinz, to Mannesmann Rexroth GmbH. Proportional magnet. 4,709,619, Cl. 92-130.00D.

Bartl, Knut; and Lill, Helmut, to Boehringer Mannheim GmbH. Process and reagent for the determination of fibrin monomer in plasma. 4,710,459, Cl. 435-13.000.

Barto, Ronald J.; Goodstine, Stephen L.; and Noto, Frank A., to Combustion Engineering, Inc. Method for determining the existence of phosphate hideout. 4,709,664, Cl. 122-379.000.

Bartolles, Rolf, to Rheinmetall GmbH. Obturator ring for a cannon. 4,709,616, Cl. 89-26.000.

Bartolozzi, Roberto: *See*—
Biagini, Giuliano; and Bartolozzi, Roberto, 4,709,854, Cl. 236-20.00R.

BASF Aktiengesellschaft: *See*—
Bachl, Robert; Warzelhan, Volker; Schweier, Guenther; Gropper, Hans; and Ball, Wolfgang, 4,710,552, Cl. 526-116.000.
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, 4,710,496, Cl. 514-183.000.
Hoffmann, Gerhard; Hofmann, Reiner; and Elzer, Albert, 4,710,446, Cl. 430-281.000.
Lechtken, Peter; Buethe, Ingolf; Jacobi, Manfred; and Trimborn, Werner, 4,710,523, Cl. 522-14.000.

BASF Corporation: *See*—
Finnan, Jeffrey L.; Lisa, Rudolph E.; and Schmidt, Douglass N., 4,710,519, Cl. 514-629.000.

Basham, Michael T.; Berdahl, Robert M.; and Field, Bruce E., to Tennant Company. Speed and steering control for a floor maintenance machine. 4,709,771, Cl. 180-6.500.

Basset Bretagne Loire - B.B.L.: *See*—
Lebas, Jean-Marie; Rat, Pierre; Dupont, Jean-Marcel; and Vinuesa, Germain, 4,710,329, Cl. 264-3.100.

Bateman, John R.; Goodacre, Brita C.; and Smithson, Alan, to Tate & Lyle Public Limited Company. Solid fructose. 4,710,231, Cl. 127-30.000.

Batza, Willi; and Rosch, Werner, to Metallgesellschaft Aktiengesellschaft. Electrostatic precipitator electrode. 4,710,203, Cl. 55-2.000.

Bausch & Lomb Incorporated: *See*—
Martino, Ronald J., 4,710,636, Cl. 250-467.100.

Bavaveas, Tristan, to Eparco. Holder for a toilet cleaning product associated with an air deodorizer. 4,709,425, Cl. 4-228.000.

Bawa, Mohendra S.: *See*—
Witter, David E.; and Bawa, Mohendra S., 4,710,260, Cl. 156-605.000.

Baxter, Gordon D.: *See*—
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., 4,710,594, Cl. 174-120.0SR.

Baxter Travenol Laboratories, Inc.: *See*—
Posey, John, 4,710,157, Cl. 493-213.000.

Bayer Aktiengesellschaft: *See*—
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, 4,710,501, Cl. 514-256.000.
Franke, Gunter; Ockelmann, Dieter; Raue, Roderich; and Wild, Peter, 4,710,569, Cl. 544-31.000.
Meier, Helmut-Martin; Heine, Hans-Georg; Pischtschan, Alfred; Dhein, Rolf; and Rudolph, Hans, 4,710,529, Cl. 524-139.000.
Reichert, Karl-Heinz; and Koschinski, Ingo, 4,710,546, Cl. 525-420.000.

BBC Brown, Boveri & Company, Limited: *See*—
Blahous, Leopold; and Linhofer, Gerhard, 4,710,735, Cl. 333-175.000.
Faber, Guy; and Kuhnen, Gottfried, 4,710,103, Cl. 416-219.00R.
Kaufmann, Felix; and Schillinger, Daniel, 4,710,863, Cl. 364-146.000.

bd Systems, Inc.: *See*—
Butts, J. James, Jr.; and Howard, Don R., 4,709,580, Cl. 73-178.00R.

Beachley, Orville T., Jr., to Research Foundation of State University of New York, The. Bisneopentyl alkyl organometallic compounds and methods of preparing same. 4,710,575, Cl. 556-1.000.

Beakes, John M.; and Finegold, Hyman B., to Statomat-Globe, Inc. Lamination stack selection method and apparatus. 4,710,085, Cl. 414-27.000.

Bechem, Martin: *See*—
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, 4,710,501, Cl. 514-256.000.

Beck, James M.; and Rohr, Robert D., to Beck, James M. Tamper evident bottle or package closure. 4,709,823, Cl. 215-235.000.

Becker, Roger J.: *See*—
Aulds, James M.; and Becker, Roger J., 4,710,641, Cl. 250-554.000.

Becton, Dickinson and Company: *See*—
Chupp, Vernon L., 4,710,635, Cl. 250-461.200.
Donohue, John, 4,710,524, Cl. 522-75.000.

Beffa, Fabio; and Schutz, Hans U., to Ciba-Geigy Corporation. 1:2 chromium or cobalt metal complex dyes and use thereof for dyeing leather. 4,710,198, Cl. 8-437.000.

Beghin-Say S.A.: *See*—
Ehret, Philippe, 4,710,184, Cl. 604-368.000.

Behar, Francoise; Roucache, Jeannine; Auger, Jean; and Boudet, Luc, to Institut Francais du Petrole. Device for heating of solid or liquid samples in small quantities. 4,710,354, Cl. 422-80.000.

Belagaje, Ramamoorthy; Kuhstoss, Stuart A.; and Rao, R. Nagaraja, to Eli Lilly and Company. Transcription terminators. 4,710,464, Cl. 435-91.000.

Belknap, William M.; Chanasyk, Albert J.; O'Dell, Robert R.; and Girard, Donald J., to NCR Corporation. Data transmitting and receiving apparatus. 4,710,871, Cl. 364-200.000.

Bell Communications Research, Inc.: *See*—
Blackwell, Catherine A.; Lakshmanan, Raman; and Subramanian, Mahadevan, 4,710,870, Cl. 364-200.000.
Jackel, Janet L., 4,709,978, Cl. 350-96.140.
Tarascon, Jean-Marie, 4,710,439, Cl. 429-194.000.

Bell, Steven R.: *See*—
Sutphin, Richard C.; Bell, Steven R.; and Monsell, Kurt, 4,710,694, Cl. 320-21.000.

Bellars, Terence G. Tractor mounted rotary cutting equipment. 4,709,736, Cl. 144-2.00N.

Bellavia, William D.; and Missert, William, to Missert, William. Method and device for establishing new dental occlusal scheme for patient. 4,710,127, Cl. 433-215.000.

Bellay, Jeffrey D.; and Powell, Theo J., to Texas Instruments Incorporated. Partitioned scan-testing system. 4,710,931, Cl. 371-25.000.

Bellay, Jeffrey D.: *See*—
Powell, Theo J.; Bellay, Jeffrey D.; Daniels, Martin D.; and Hwang, Yin-Chao, 4,710,933, Cl. 371-25.000.

Benayad-Cherif, Faycal E.: *See*—
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., 4,710,020, Cl. 356-1.000.

Benchev, Dimiter V.: *See*—
Dyakov, Nikola G.; Guguchkova-Yanchuleva, Pravoslava T.; and Benchev, Dimiter V., 4,710,196, Cl. 623-6.000.

Bennett, Richard J.: *See*—
Bailey, Lorraine F.; and Bennett, Richard J., 4,710,217, Cl. 65-31.000.

Bennett, Robert E. Camera flash mount. 4,710,005, Cl. 354-126.000.

Berdahl, Robert M.: *See*—
Basham, Michael T.; Berdahl, Robert M.; and Field, Bruce E., 4,709,771, Cl. 180-6.500.

Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., to Shop-Vac Corporation. Debris pan for rotary brush sweeper. 4,709,436, Cl. 15-79.00R.

Berg, Lloyd; and Vosburgh, Mark G. Separation of ethanol from isopropanol by extractive distillation. 4,710,274, Cl. 203-51.000.

Berg, Lloyd; and Vosburgh, Mark G. Separation of isopropanol from t-butanol by extractive distillation. 4,710,275, Cl. 203-51.000.

Berger, Alan D.: *See*—
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., 4,710,020, Cl. 356-1.000.

Berger, Friedrich: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.

Bergman, Lee H., to Toth Aluminum Corporation. Oxidation method for production of special aluminas from pure aluminum chloride. 4,710,369, Cl. 423-625.000.

Bergmeier, Stephen C.; Downs, David A.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, to Warner-Lambert Company. O-substituted tetrahydropyridine oxime cholinergic agents. 4,710,508, Cl. 514-357.000.

Bergstrom, Donald J.; and Wolfer, Allan J., to Anacomp, Inc. Process and apparatus for characterizing and controlling a synchronous motor in microstepper mode. 4,710,691, Cl. 318-696.000.

Bergwerksverband GmbH: *See*—
Pollert, Georg, 4,710,302, Cl. 210-696.000.

Berke, Howard M.; and Lyons, Harold W., to Whelen Engineering Co., Inc. Siren with remote driver. 4,710,749, Cl. 340-405.000.

Berke, Joseph J.: *See*—
Muller, George H., 4,709,697, Cl. 128-303.00R.

Bernard, John A.; Henry, Allan F.; Lanning, David D.; and Kwok, Kwan S., to Massachusetts Institute of Technology. Apparatus and method for closed-loop control of reactor power. 4,710,341, Cl. 376-216.000.

Bernhard, Ragnar: *See*—
Santen, Sven; Eriksson, Sven; and Bernhard, Ragnar, 4,710,269, Cl. 162-30.100.

Bernstein, Michael: *See*—
Lerner, Michael; Bernstein, Michael; and Selame, Robert, 4,709,429, Cl. 4-661.000.

Berol Kemi AB: *See*—
Elsby, Leif; and Carlsson, Agneta, 4,710,267, Cl. 162-5.000.

Berry, W. Wes, to Advanced Separation Technologies Incorporated. Continuous recovery of sulfur oxide from flue gas. 4,710,364, Cl. 423-244.000.

Berta, Joseph: *See*—
Joseph, Gerald; and Berta, Joseph, 4,709,908, Cl. 267-140.400.

Bertelli, Guido; and Locatelli, Renato, to Himont Incorporated. Flame resistant thermoplastic polymeric compositions comprising (1) melamine bromohydrate and (2) Sb or As compound endowed with improved flame-resistance. 4,710,528, Cl. 524-100.000.

Bertram, Leo: *See*—
Schroder, Johann; Gawron, Klaus; Bertram, Leo; and Schemmann, Hugo, 4,709,752, Cl. 165-47.000.

Besanceney, Michel, to Alsthom. Inspection device for rotor binding defects in electrical machines. 4,709,582, Cl. 73-622.000.

Bestenreiner, Georg: *See*—
Tittizer, Gabriel; Junghans, Ewald; Bestenreiner, Georg; and Dahm, Christian, 4,710,034, Cl. 384-110.000.

Betts Industries, Inc.: *See*—
Pierson, Karl B.; Mooney, Thomas E.; and Jones, William G., 4,709,901, Cl. 251-58.000.

Beuhler, Allyson J.: *See*—
Polak, Anthony J.; and Beuhler, Allyson J., 4,710,278, Cl. 204-129.000.

Beyda, Marilyn: *See*—
Beyda, Marlee; and Beyda, Marilyn, 4,709,954, Cl. 294-142.000.

Beyda, Marlee; and Beyda, Marilyn. Hand carrying device for garment hangers. 4,709,954, Cl. 294-142.000.

Biagini, Giuliano; and Bartolozzi, Roberto, to Nuovopignone-Industrie Meccaniche e Fonderia S.p.A. System for regulating temperature of hot water in wall-hung instantaneous mixed gas heating units. 4,709,854, Cl. 236-20.00R.

Bianchi, Valerio; and Conticelli, Carlo, to Weber S.p.A. System for automatically controlling the idling speed of an internal combustion engine. 4,709,674, Cl. 123-339.000.

BICC Public Limited Company: *See*—
Corne, Robert W.; and Hagger, John M. R., 4,709,982, Cl. 350-96.230.
Plessner, Karl W.; and Poole, Michael J., 4,709,983, Cl. 350-96.230.

Biddle, Deloss J.: *See*—
McAbee, Mac P.; and Biddle, Deloss J., 4,710,598, Cl. 200-21.000.

Bielecki, Anthony: *See*—
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, 4,710,714, Cl. 324-307.000.

Bierman, Albert. Electric roach trap. 4,709,502, Cl. 43-112.000.

Bigley, James E., to Scott & Fetzer Company, The. Appearance fabric panel with in situ molded frame. 4,709,443, Cl. 15-339.000.

Biniasz, Franz-Josef: *See*—
Lepand, Heinz; Huser, Margrit; Biniasz, Franz-Josef; and Fuchs, Axel, 4,710,244, Cl. 148-333.000.

Biogen N.V.: *See*—
Murray, Kenneth, 4,710,463, Cl. 435-68.000.

Bird, Elizabeth A., to Cottage Industries (Equestrian) Limited. Girth strap. 4,709,539, Cl. 54-23.000.

Birkmire, Robert W.: *See*—
McCandless, Brian E.; and Birkmire, Robert W., 4,709,466, Cl. 437-5.000.

Birnbach, Curtis; and Tanner, Jay, to Quantum Diagnostics Ltd. X-ray frequency down converter. 4,710,939, Cl. 372-73.000.

Bis, Josef; and Petrzelka, Antonin, to Tovarny Strojirenske Techniky Koncern. Device for controlling movement of a copying roller. 4,709,434, Cl. 12-77.000.

Bishop, Daniel E., to United States of America, Army. Lever displacement gauge. 4,709,484, Cl. 33-169.00R.

Black, Alfred T.: *See*—
Saur, Joseph W.; Reynolds, Charles P.; and Black, Alfred T., 4,710,472, Cl. 435-287.000.

Black & Decker Inc.: *See*—
Koehler, Heinrich P.; and Dixon, John R., 4,710,071, Cl. 408-133.000.

Black, John W., to Standex International Corporation. Wheel bracket mounting structure. 4,709,444, Cl. 16-31.00A.

Blackburn, Douglas; Feldman, Albert; and Lagakos, Nicholas, to United States of America, Navy. Pressure and temperature insensitive glass and optical coatings and fibers therefrom. 4,709,987, Cl. 350-96.340.

Blackerby, William I. Apparatus and method for improving drive for a circular knitting machine to reduce wear and gear breakage. 4,709,561, Cl. 66-8.000.

Blackwell, Catherine A.; Lakshmanan, Raman; and Subramanian, Mahadevan, to Bell Communications Research, Inc. Central computer backup system utilizing localized data bases. 4,710,870, Cl. 364-200.000.

Blahous, Leopold; and Linhofer, Gerhard, to BBC Brown, Boveri & Company, Limited. Absorption circuit. 4,710,735, Cl. 333-175.000.

Blair, Christon R.; and Parker, Kenneth B., to Atlantic Richfield Company. Offshore well apparatus and method. 4,710,061, Cl. 405-195.000.

Blakeney, Andrew J.: *See*—
Lewis, James M.; and Blakeney, Andrew J., 4,710,449, Cl. 430-326.000.

Blanchard, Pierre, to Thomson—CSF. Process for manufacturing an anti-blooming diode associated with a surface canal. 4,710,234, Cl. 437-40.000.

Blockisch, Olaf: *See*—
Mierbach, Hans-Bernd; Frohn, Gustav K.; and Blockisch, Olaf, 4,709,600, Cl. 81-57.390.

Blohm & Voss AG: *See*—
Sadler, Karl-Otto; Schmidt, Willy; and Franz, Hans-Joachim, 4,709,646, Cl. 114-5.000.

Blood Center of Southeastern Wisconsin, The: *See*—
Kunicki, Thomas J.; and Montgomery, Robert R., 4,710,381, Cl. 424-101.000.

Blumenthal, Jack L.: *See*—
Burk, Maksymilian; and Blumenthal, Jack L., 4,710,483, Cl. 502-185.000.

Bly, Tom C., to Johnson Service Company. Method of injection molding and plastic part formed thereby. 4,709,757, Cl. 165-173.000.

Board of Regents, The University of Texas System: *See*—
Vaughn, Mark R., 4,710,035, Cl. 384-115.000.

Boblitt, Wayne W., to United States of America, Navy. Method for cutting complex tooth profiles in a cylindrical, single-screw gate-rotor. 4,710,076, Cl. 409-26.000.

Bocchi, Vittorio: *See*—
Gardini, Gian P.; and Bocchi, Vittorio, 4,710,400, Cl. 427-121.000.

Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., to Motorola, Inc. Signal selection by statistical comparison. 4,710,945, Cl. 375-100.000.

Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., to Motorola, Inc. Data detection by statistical analysis. 4,710,957, Cl. 380-42.000.

Bock, Jan; Pace, Salvatore J.; and Schulz, Donald N., to Exxon Research and Engineering Company. Enhanced oil recovery with hydrophobically associating polymers containing N-vinyl-pyrrolidone functionality. 4,709,759, Cl. 166-275.000.

Boda, Keiji; Waki, Kouichirou; and Yanagisawa, Keizo, to Mazda Motor Corporation; and Japan Automatic Transmission Co., Ltd. Control of a vehicle automatic transmission. 4,709,596, Cl. 74-868.000.

Bodor, Nicholas S., to Otsuka Pharmaceutical Co., Ltd. Soft steroids having anti-inflammatory activity. 4,710,495, Cl. 514-174.000.

Bodovsky, Paul W.; and Rodgers, Donald H., to Continental Conveyor & Equipment Co., Inc. Air filtering apparatus with roller assembly for cleaning. 4,710,207, Cl. 55-290.000.

Boehringer Mannheim Corporation: *See*—
Davison, Dale, 4,710,075, Cl. 408-202.000.

Boehringer Mannheim GmbH: *See*—
Bartl, Knut; and Lill, Helmut, 4,710,459, Cl. 435-13.000.
Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, 4,710,510, Cl. 514-394.000.

Boeing Company, The: *See*—
Coe, Richard J., 4,710,775, Cl. 343-727.000.
Pinson, George T., 4,709,876, Cl. 244-3.160.

Bogan, Gary W.; Lucas, Peter A.; Monnerat. Georgia A.; and Aldrich, Dale J., to Dow Chemical Company, The. Laminates from epoxidized phenol-hydrocarbon adducts. 4,710,429, Cl. 428-417.000.

Boggero, Henri, to Matra. Temperature sensitive pyrotechnical train interruption device. 4,709,637, Cl. 102-481.000.

Boginsky, Vladimir P.: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.

Bogsch, Erik: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Bolsand, Leona G.; Stevens, Robert A.; Wilson, John C.; and Zehner, Georgia L., to Kimberly-Clark Corporation. Form-fitting self-adjust-

ing disposable garment with a stretchable bodyside liner. 4,710,187, Cl. 604-385.00A.

Boliden Aktiebolag: *See*—
Dyvik, Froystein; and Mioen, Thomas K., 4,710,277, Cl. 204-119.000.

Bolton, Curtis W., III: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Bonenberger, Kenneth E., to Litton Systems, Inc. Limited rotation twist capsule. 4,710,131, Cl. 439-13.000.

Bonenfant, Alain: *See*—
Robin, Jacques; Pruneau, Didier; and Bonenfant, Alain, 4,710,505, Cl. 514-278.000.

Bongiovanni, Nicola; and Cianfarani, Vincent. Highway cable clamp. 4,709,887, Cl. 248-66.000.

Boots Company PLC, The: *See*—
Davies, Roy V.; and Fraser, James, 4,710,506, Cl. 514-301.000.

Borchardt, Horst, to Arntz-Optibelt-KG. Process for manufacturing endless belts. 4,710,251, Cl. 156-137.000.

Borchardt, Michael G.; Dorsey, Robert T.; and Kamp, Ewald A., to First Brands Corporation. Trident interlocking closure profile configuration. 4,710,968, Cl. 383-63.000.

Bordovsky, Michael J.; and Feik, John W., to Dermatalogical Products of Texas. Polycarboxylic acid polymer gels as protective agents. 4,709,712, Cl. 132-7.000.

Borg-Warner Corporation: *See*—
Ferris, Ernest A., 4,709,795, Cl. 192-106.00F.

Borrelli, Nicholas F.; Hares, George B.; Smith, Dennis W.; and Wedding, Brent M., to Corning Glass Works. Colored photochromic glasses and method. 4,710,430, Cl. 428-432.000.

Borsuk, Alvin, to Oscar Mayer Foods Corporation. Pass-through proteinaceous patty making apparatus. 4,709,449, Cl. 17-32.000.

Bosch-Siemens Hausgerate GmbH: *See*—
Kruger, Manfred; and Mucha, Lawrence S., 4,709,835, Cl. 222-87.000.

Bostelmann, Rudolf: *See*—
Kageler, Peter; Bostelmann, Rudolf; and Buhrmester, Olaf, 4,710,066, Cl. 406-29.000.

Boston Biomedical Research Institute: *See*—
Jacobson, Bernard, 4,710,462, Cl. 435-68.000.

Boston University, Trustees of: *See*—
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,710,490, Cl. 514-25.000.

Bottin, Marie-Francoise: *See*—
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., 4,710,594, Cl. 174-120.0SR.

Bottrell, Gerald W. System for production of induction machines against damage from residual voltage effects. 4,710,841, Cl. 361-23.000.

Boudet, Luc: *See*—
Behar, Francoise; Roucache, Jeannine; Auger, Jean; and Boudet, Luc, 4,710,354, Cl. 422-80.000.

Boulanger, Paul. Paddle-driven watercraft. 4,710,143, Cl. 441-65.000.

Bounds, William E. Dual condiment mill. 4,709,865, Cl. 241-169.100.

Bove, Alfred A.: *See*—
Lazarow, Normand H.; and Bove, Alfred A., 4,709,703, Cl. 128-654.000.

Bowles Fluidics Corporation: *See*—
Stouffer, Ronald D.; and Sharkitt, Patrick T., 4,709,622, Cl. 98-2.000.

Bowman, Donald E., to Mobil Oil Corporation. Shaft alignment method and apparatus. 4,709,485, Cl. 33-228.000.

Bowman, Lawrence S. Handy-cap pick-up cover. 4,709,956, Cl. 296-100.000.

Boyadjieff, George I., to Varco International, Inc. Well pipe handling machine. 4,709,766, Cl. 175-52.000.

Boyle, William J., Jr.; Mares, Frank; and Corbo, Andrea M., to Allied Corporation. Polymer-bound alkyl diarylphosphinite catalyst compositions and processes for making same. 4,710,545, Cl. 525-340.000.

Boyne, Gail E.: *See*—
Hinch, Henry H.; Boyne, Gail E.; Daniels, David L.; and Kullmann, Eugene V., 4,710,946, Cl. 378-62.000.

Bradfield, Ganey W.; and Cragin, Glynn P., Jr., to General Dynamics Corporation. Method and system for improved V/STOL aircraft performance. 4,709,880, Cl. 244-12.500.

Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., to PA Incorporated. Method and apparatus for measuring defects in ferromagnetic elements. 4,710,712, Cl. 324-227.000.

Bradley, James D.; and Pfeffer, George B., to ADC Telecommunications, Inc. Electrical connector apparatus. 4,710,138, Cl. 439-581.000.

Bradley, William B.; and Holbrook, Philip, to NL Industries, Inc. Method and system for monitoring the stability of boreholes. 4,710,906, Cl. 367-35.000.

Bradshaw, Peter S.: *See*—
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., 4,709,948, Cl. 285-381.000.

Brand, Wilhelm; Vanek, Vaclav; and Jakobec, Franz, to Siemens Aktiengesellschaft. Apparatus for positioning a magnetic disk read head with pulse operated detent magnet. 4,710,834, Cl. 360-105.000.

Brandt, Inc.: *See*—
Taylor, Lawrence D., 4,709,914, Cl. 271-263.000.

Brdr. Ludvigsen, Tommfrup APS: *See*—
Ludvigsen, Poul F. B., 4,710,084, Cl. 412-9.000.

Breault, Ronald W.: *See*—
Larson, John W.; and Breault, Ronald W., 4,709,663, Cl. 122-4.00D.

Breen, Thomas B., to General Electric Company. Selectable integrating characteristic timer. 4,710,843, Cl. 361-96.000.

Breier, Morton: *See*—
Powers, Steven; and Breier, Morton, 4,709,613, Cl. 84-413.000.

Brendel, Kathleen E.: *See*—
Luckey, George W.; Roth, Bernard; Brendel, Kathleen E.; and Den Dunne, Margaret S., 4,710,637, Cl. 250-486.100.

Brenner, Barnett S. Recirculating heating system. 4,709,855, Cl. 237-12.30A.

Brennstoffinstitut Freiberg: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.

Breslow, Jeffrey D.; Morrison, Howard J.; Hanson, Steven P.; and Rasmussen, Russell G., to Marvin Glass & Associates. Video game incorporating digitized images of being into game graphics. 4,710,873, Cl. 364-410.000.

Breymayer, Angela: *See*—
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.

Bridges, Charles D.: *See*—
Adamek, Frank C.; and Bridges, Charles D., 4,709,933, Cl. 277-167.500.

Bridgestone Corporation: *See*—
Tomita, Seisuke; and Hashimoto, Takatsugu, 4,710,541, Cl. 525-104.000.

Brigasky, Hans: *See*—
Ziebig, Anton; Brigasky, Hans; and Lewand, Willi, 4,710,123, Cl. 425-464.000.

Briggs, Thomas B.: *See*—
Smith, Robert R.; and Briggs, Thomas B., 4,710,177, Cl. 604-185.000.

Brilmyer, George H.; and Marshall, Dennis L. Method and apparatus for electrochemically cleaning gun bores and the like. 4,710,280, Cl. 204-146.000.

Britz, Raymond P., to 3M Holding Co. Ltd.; and Magill-Stephenson Company Limited, a part interest. Fluid clarifying assembly. 4,710,290, Cl. 210-199.000.

Briosi, Antonello. Simplified metallic structures and procedure for their production. 4,709,642, Cl. 108-111.000.

Bristol-Myers Company: *See*—
Kim, Choung Un.; and Misco, Peter F., Jr., 4,710,568, Cl. 540-350.000.

British Aerospace PLC: *See*—
Goulding, Kenneth, 4,709,877, Cl. 244-3.280.
Titley, Mark C., 4,709,878, Cl. 244-328.000.

Broden, David E.; Martwick, Wilford E.; and Warren, John B., to Honeywell Inc. Discarding sabot projectile. 4,709,638, Cl. 102-522.000.

Broderick, Thomas B.; Algrim, Donald J.; and Hayden, Richard F., to Owens-Corning Fiberglas Corporation. Insulation batt with press-on facing flanges. 4,709,523, Cl. 52-406.000.

Broen Armatur A/S: *See*—
Hansen, Anders N., 4,709,902, Cl. 251-315.000.

Broman, Donald E.; Hansen, Loren F.; and Huber, Donald J., to Outboard Marine Corporation. Grass/lawn debris handling system. 4,709,541, Cl. 56-202.000.

Brooker, Reginald D.: *See*—
Wilkins, David R. G.; Brooker, Reginald D.; Walker, Roger; and Powell, Harry, 4,709,630, Cl. 101-93.220.

Brookes, Richard L. Sanitary door handle having an upper housing and a spacer element. 4,710,634, Cl. 250-455.100.

Broquere, Bernard; and Etienne, Jacques, to Societe Europeenne de Propulsion. Process for manufacturing a turbine or compressor wheel made of composite material and wheel thus obtained. 4,709,457, Cl. 29-156.80R.

Brouwer, Marius S.; and Grosscurt, Arnoldus C., to Duphar International Research B.V. Insecticidal and acaricidal composition comprising a benzoylurea compound. 4,710,516, Cl. 514-594.000.

Brown, Boveri & CIE Aktiengesellschaft: *See*—
Nippert, Georg; Hahn, Berthold; and Gobrecht, Jens, 4,710,795, Cl. 357-65.000.

Brown, Donald W.; Leth, James W.; and Vandendorpe, James E., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Fault recovery in a distributed processing system. 4,710,926, Cl. 371-9.000.

Brown, Garrett W. Suspension system for supporting and conveying equipment, such as a camera. 4,710,819, Cl. 358-229.000.

Brown & Root, Inc.: *See*—
Hazlegrove, Billy M.; and Roberts, Richard A., 4,710,059, Cl. 405-162.000.

Brown, Wayne M.: *See*—
Stevens, Leonard W.; Siwik, William S.; Moore, William A.; Brown, Wayne M.; and Barnard, Andrew A., 4,709,545, Cl. 60-39.080.

Brownstein, Scott A.: *See*—
Caine, Holden; and Brownstein, Scott A., 4,710,783, Cl. 346-76.0PH.

Brunet, Pierre. Motorized moving device. 4,709,772, Cl. 180-8.200.

Bruning, Jurgen; Emberger, Roland; Hopp, Rudolf; and Sand, Theodor, to Haarmann & Reimer GmbH. Flavoring with oct-2-en-4-ol. 4,710,392, Cl. 426-534.000.
Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., to Martin Marietta Corporation. Process for forming metal-ceramic composites. 4,710,348, Cl. 420-129.000.
Brusch, Donald W.: *See*—
Wachsmuth, Robert H.; and Brusch, Donald W., 4,710,128, Cl. 434-46.000.
Bryant, David R.; and Galley, Richard A., to Gambro Dialysatoren KG; and Gambro Lundia AB. Process for removing triorganophosphine from an organic liquid. 4,710,587, Cl. 568-454.000.
Bryson, Neil B.; Auchterlonie, David T. T.; LeBlanc, Guy; and Newberry, Vincent J., to Alcan International Limited. Modular mould system and method for continuous casting of metal ingots. 4,709,744, Cl. 164-472.000.
Bryson, Robert M., to Hollister Incorporated. Ostomy appliance and method of making. 4,710,182, Cl. 604-339.000.
Buck, David A. Compensating jaw assembly for power tongs. 4,709,599, Cl. 81-57.180.
Buck, James R. Adjustable sidewardly located bar puller. 4,709,603, Cl. 82-2.500.
Buck, Leslie J.: *See*—
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., 4,709,948, Cl. 285-381.000.
Buckley, Thomas F., to Chevron Research Company. Modified succinimides (IX). 4,710,201, Cl. 44-63.000.
Buckwalter, Kendrick. Separator means for framelike devices. 4,709,495, Cl. 40-158.00R.
Budinger, A. Bowman; and Lapatovich, Walter P., to GTE Laboratories Incorporated. Fluorescent light source excited by excimer emission. 4,710,679, Cl. 315-58.000.
Buerstinghaus, Rainer; and Adolphi, Heinrich. Bisthiophosphates and their use for controlling pests. 4,710,494, Cl. 514-143.000.
Buess, Ronald P.: *See*—
Barth, Russell W.; and Buess, Ronald P., 4,710,416, Cl. 428-119.000.
Buethe, Ingolf: *See*—
Lechtken, Peter; Buethe, Ingolf; Jacobi, Manfred; and Trimborn, Werner, 4,710,523, Cl. 522-14.000.
Buhayar, Eric S. Rotary cutter blade clamp. 4,709,607, Cl. 83-342.000.
Buhrmester, Olaf: *See*—
Kageler, Peter; Bostelmann, Rudolf; and Buhrmester, Olaf, 4,710,066, Cl. 406-29.000.
Buis, Jeffrey A.: *See*—
Hall, Ernest M., Jr.; and Buis, Jeffrey A., 4,710,593, Cl. 174-88.00R.
Buljan, Sergej-Tomislav: *See*—
Baldoni, J. Gary, II; Buljan, Sergej-Tomislav; and Sarin, Vinod K., 4,710,425, Cl. 428-328.000.
Buon, Georges A.: *See*—
Schmukler, Charles S.; and Buon, Georges A., 4,710,643, Cl. 250-573.000.
Burk, Maksymilian; and Blumenthal, Jack L., to TRW Inc. Novel carbonaceous material and process for producing a high BTU gas from this material. 4,710,483, Cl. 502-185.000.
Burke, Michael J.; Pidsosny, Richard A.; and Lehner, Gerald J., to Ford Motor Company. Electronic odometer. 4,710,888, Cl. 364-561.000.
Burlington Industries, Inc.: *See*—
Cates, Barbara J.; and FitzGerald, Tanya E., 4,710,200, Cl. 8-574.000.
Burmaster, Neal C.: *See*—
Harbolt, Bruce; Murata, Perry L.; and Burmaster, Neal C., 4,710,360, Cl. 422-269.000.
Burrington, James D.: *See*—
Cesa, Mark C.; and Burrington, James D., 4,710,574, Cl. 548-533.000.
Busak & Luyken GmbH and Co.: *See*—
Edlund, Roy; and Hom, Jorgen, 4,709,932, Cl. 277-165.000.
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, to Didier-Werke AG. Method of ceramic molding which produces a porosity gradient and the manufacture of compound moldings using this method. 4,710,480, Cl. 501-95.000.
Buschow, Kurt H. J.: *See*—
Van Engelen, Petrus P. J.; and Buschow, Kurt H. J., 4,710,431, Cl. 428-457.000.
Butterfield, Robert D., to Ivac Corporation. Detection of fluid flow faults in the parenteral administration of fluids. 4,710,163, Cl. 604-65.000.
Buttner, Gerhard, to Siemens Aktiengesellschaft. Miniature hearing aid having a bindable multi-layered amplifier arrangement. 4,710,961, Cl. 381-68.700.
Butts, J. James, Jr.; and Howard, Don R., to bd Systems, Inc. Retroflective attitude determining system. 4,709,580, Cl. 73-178.00R.
Bw Brown University Research Foundation: *See*—
Tauc, Jan; Maris, Humphrey J.; and Thomsen, Christian, 4,710,030, Cl. 356-432.000.
Byrne, Joseph B., to Dow Chemical Company, The. Blends of a polycarbonate with a polyester-polycarbonate copolymer. 4,710,548, Cl. 525-439.000.
C. Conradty Nurnberg GmbH & Co.: *See*—
Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, 4,710,607, Cl. 219-121.00P.
C & K Systems, Inc.: *See*—
Johnson, Richard A., 4,710,750, Cl. 340-522.000.
Cagey, Lee B., to LogEtronics, Inc. Storage cassette for film processing system. 4,709,913, Cl. 271-207.000.
Cain Encoder Co.: *See*—
Wason, Thomas D., 4,710,889, Cl. 364-571.000.
Cain, Michael P.: *See*—
McKee, Bobby D.; Cain, Michael P.; Delvecchio, Robert M.; and Aivaliotis, Emmanuel, 4,710,660, Cl. 310-178.000.
Caine, Holden; and Brownstein, Scott A., to Eastman Kodak Company. Temperature compensated continuous tone thermal printer. 4,710,783, Cl. 346-76.0PH.
Caldwell, Michael D.: *See*—
Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 4,710,174, Cl. 604-175.000.
California Institute of Technology: *See*—
Sipes, Donald L., Jr., 4,710,940, Cl. 372-75.000.
Camco, Incorporated: *See*—
Pringle, Ronald E., 4,709,762, Cl. 166-324.000.
Camiciotti, Leonardo; and Furia, Edoardo, to Novitex s.r.l. Needle-selecting system for circular knitting machine. 4,709,563, Cl. 66-222.000.
Camillo, Bianchi, to SILCA S.p.A. Clamp for lock key duplicating machine. 4,709,511, Cl. 51-216.00R.
Campanell, Ronald J. Tack driver. 4,709,765, Cl. 173-119.000.
Campbell, Frank P. Multiple purpose hanger. 4,709,838, Cl. 223-85.000.
Campbell, Joseph J.: *See*—
Lang, James J., 4,710,304, Cl. 210-734.000.
Campbell, Simon F.; and Roberts, David A., to Pfizer Inc. Quinolone inotropic agents. 4,710,507, Cl. 514-312.000.
Camus, Etienne, to Jeumont-Schneider Corporation. Apparatus for monitoring the period of separation of impulses. 4,710,721, Cl. 328-109.000.
Camus, Michel, to Arjomari-Prioux. Security document using optical fibers and authentication method. 4,710,614, Cl. 235-380.000.
Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See*—
Ho, Jim Y. W., 4,710,887, Cl. 364-555.000.
Canadian Bird Equipment Limited: *See*—
McGuire, Bernie; Innes, Robert S.; and Pagowski, Stefan, 4,709,448, Cl. 17-11.000.
Candle, Richard D., to Goodyear Tire & Rubber Company, The. Folding belt system and said belt. 4,709,806, Cl. 198-819.000.
Candler, Darrell E. Film storage system. 4,709,869, Cl. 242-673.00R.
Canivet, Patrick: *See*—
Madrange, Annie; and Canivet, Patrick, 4,710,314, Cl. 252-117.000.
Cano, Richard A. Exercise machine. 4,709,919, Cl. 272-117.000.
Canon Kabushiki Kaisha: *See*—
Fujiyama, Yasutomo, 4,709,656, Cl. 118-723.000.
Higomura, Makoto, 4,710,865, Cl. 364-170.000.
Ishikawa, Tadashi; Matsuo, Kazuhiro; and Hoshi, Akimitsu, 4,709,915, Cl. 271-288.000.
Kanbe, Junichiro; and Okada, Shinjiro, 4,709,994, Cl. 350-350.00S.
Kuribayashi, Masaki; Nakazawa, Toshihiko; and Kanbe, Junichiro, 4,709,995, Cl. 350-350.00S.
Masuda, Takashi; Nakamura, Yukitugu; and Sekiguchi, Kyoji, 4,710,003, Cl. 351-212.000.
Namai, Akihiro; Egawa, Akira; and Kodaira, Takanori, 4,710,010, Cl. 354-400.000.
Negi, Tsuneo, 4,710,925, Cl. 371-5.000.
Nishimura, Akimasa, 4,710,831, Cl. 360-99.000.
Ohta, Shinichi, 4,710,821, Cl. 358-256.000.
Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, 4,710,418, Cl. 428-192.000.
Tanaka, Katsuhiko; and Fukumoto, Hiroshi, 4,710,443, Cl. 430-106.600.
Tanaka, Kazuo, 4,710,007, Cl. 354-286.000.
Tosaka, Yoichi; and Shimizu, Masami, 4,710,008, Cl. 354-289.100.
Yamada, Masanori, 4,710,012, Cl. 354-415.000.
Cantwell, Robert H.; Marksteiner, William K.; and Hansen, V. Gregers, to Raytheon Company. Log magnitude pulse interference detection for a radar system. 4,710,772, Cl. 342-92.000.
Carbonaro, Antonio; Gordini, Silvano; and Cucinella, Salvatore, to Enichem Elastomeri S.p.A. Process for the polymerization or copolymerization of butadiene. 4,710,553, Cl. 526-142.000.
Carl Freudenberg, Firma: *See*—
Forch, Hans, 4,709,930, Cl. 277-68.000.
Fottinger, Walter; and Jorder, Kurt, 4,709,490, Cl. 36-44.000.
Carl-Zeiss-Stiftung: *See*—
Machler, Meinrad, 4,709,989, Cl. 350-321.000.
Carlsson, Agneta: *See*—
Elsby, Leif; and Carlsson, Agneta, 4,710,267, Cl. 162-5.000.
Carlton, Gary J.: *See*—
Wood, Louis L.; and Carlton, Gary J., 4,710,467, Cl. 435-108.000.
Carnahan, V. B. Remountable wall/ceiling molding. 4,709,522, Cl. 52-287.000.
Carrera, Cesare: *See*—
Ruscelli, Emilio; Carrera, Cesare; and Formenti, Giuseppe, 4,709,739, Cl. 152-453.000.
Carrier Corporation: *See*—
Voorhis, Roger; Erbs, Daryl G.; Palmer, John M.; and Marris, Derrick A., 4,709,560, Cl. 62-508.000.
Carroll, Noel: *See*—
Prendergast, Gavan J. J., 4,710,299, Cl. 210-512.100.

Cartier, Philip A.: *See*—
Holmgren, Mark E.; Parrish, Gregory K.; and Cartier, Philip A., 4,710,393, Cl. 426-660.000.

Cartmell, Robert L.; Daugherty, Charles W.; and Ireland, David B., to Deseret Medical, Inc. Intravenous infusion assembly formed as an integral part. 4,710,175, Cl. 604-177.000.

Case, Roger: *See*—
Neel, Jean-Philippe; Case, Roger; and Garnier, Gilbert, 4,710,738, Cl. 335-172.000.

Casio Computer Co., Ltd.: *See*—
Sakurai, Keiichi, 4,710,826, Cl. 360-9.100.
Shigenaga, Yoshimi, 4,710,613, Cl. 235-380.000.

Caspary, Charles P.: *See*—
Passarelli, Frank J.; Matsukas, George A.; and Caspary, Charles P., 4,710,272, Cl. 202-205.000.

Castcraft Industries, Inc.: *See*—
Kreiter, Manny, 4,710,447, Cl. 430-293.000.

Cates, Barbara J.; and FitzGerald, Tanya E., to Burlington Industries, Inc. Process for the continuous dyeing of poly(m-phenylene-isophthalamide) fibers. 4,710,200, Cl. 8-574.000.

Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, to Angio Medical Corporation; and Boston University, Trustees of. Compositions containing ganglioside molecules with enhanced angiogenic activity. 4,710,490, Cl. 514-25.000.

Cattani, Augusto, to Officine Agusto Cattani & C. S.p.A. Moisture trap for fluid suction equipment, in particular as employed in dentistry. 4,710,209, Cl. 55-418.000.

Celanese Corporation: *See*—
Uryu, Toshiyuki; and Kato, Takashi, 4,710,547, Cl. 525-437.000.

Celotex Corporation, The: *See*—
Soukup, Thomas G.; and Oliver, John P., 4,710,521, Cl. 521-118.000.

Center, Gene R., to R. E. Baker Company, Inc. Escalator sweeping mechanism. 4,709,441, Cl. 15-301.000.

Central Glass Company, Limited: *See*—
Kita, Yasushi; and Moroi, Shiro, 4,710,335, Cl. 264-105.000.

Centre National de la Recherche Scientifique "CNRS": *See*—
Le Caer, Gerard; and Dubois, Jean-Marie, 4,710,246, Cl. 148-403.000.

Cerberus AG: *See*—
Muller, Kurt; and Meier, Walter, 4,710,629, Cl. 250-342.000.

Cesa, Mark C.; and Burrington, James D., to Standard Oil Company, The. α-amino acids through catalytic reaction of CO and a hydroxyl compound with enamides. 4,710,574, Cl. 548-533.000.

Ceskoslovenska akademie ved: *See*—
Kristoufek, Jaroslav, 4,710,300, Cl. 210-603.000.

Cessna Aircraft Company, The: *See*—
Zongker, Dwight E., 4,709,618, Cl. 91-31.000.

Cetinkaya, Ismail B.; and Myers, Daniel N., to UOP Inc. FCC combustion zone catalyst cooling apparatus. 4,710,357, Cl. 422-144.000.

CF Braun & Company: *See*—
Smart, Leonard G.; and Hui, Henry T., 4,709,886, Cl. 248-49.000.

Chak, Maryan; and Dobruskin, Moisey. Device for siliverizing running water. 4,710,282, Cl. 204-228.000.

Chambers, Samuel C.: *See*—
Sabroff, Alvin M.; Chambers, Samuel C.; and Ream, James C., 4,709,569, Cl. 72-340.000.

Chambon, Jean-Pierre: *See*—
Wermuth, Camille G.; and Chambon, Jean-Pierre, 4,710,499, Cl. 514-247.000.

Champavier, Louis, to Vita Center Inc. Method and device for converting an analog signal into a pulse signal. 4,710,748, Cl. 340-347.0AD.

Chanasyk, Albert J.: *See*—
Belknap, William M.; Chanasyk, Albert J.; O'Dell, Robert R.; and Girard, Donald J., 4,710,871, Cl. 364-200.000.

Chang, Chang, to Virco Mfg. Corporation. Safety hinge. 4,710,049, Cl. 403-23.000.

Chang, Joseph Y.: *See*—
McGregor, William H.; and Chang, Joseph Y., 4,710,580, Cl. 558-86.000.

Chang, Keh-Minn: *See*—
Huang, Shyh-Chin; Chang, Keh-Minn; and Taub, Alan I., 4,710,247, Cl. 148-429.000.

Chang, King-chang. Automatic shut-off device for fuel dispenser. 4,709,735, Cl. 141-209.000.

Chapman, James B., to Revere Copper and Brass Incorporated. Apparatus for removing a die from a die ring. 4,710,120, Cl. 425-185.000.

Chapman, Victor B.; and Lacey, Paul D., to De La Rue Systems Ltd. Apparatus for sensing the condition of a document. 4,710,963, Cl. 382-7.000.

Charvet, Jean-Louis, to Compagnie Generale des Etablissments Michelin. Reinforcement assembly having a layer comprising a shaped thread: articles comprising such assemblies. 4,709,544, Cl. 57-218.000.

Chase, Richard P.; Englander, Gary E.; German, Martin A.; and Volk, Joseph F., to Warner & Swasey Company, The. Dual wheel cylindrical grinding center. 4,709,514, Cl. 51-325.000.

Chattha, Mohinder S.; and Theodore, Ares N., to Du Pont de Nemours, E. I., and Company. Glycidyl-hydroxy-acrylic high solids coating compositions. 4,710,543, Cl. 525-161.000.

Chen, John Y., to Hughes Aircraft Company. Method for forming latch-up immune, multiple retrograde well high density CMOS FET. 4,710,477, Cl. 437-34.000.

Cheskis, Harvey P.: *See*—
Young, Kenneth P.; Tyler, Derek E.; Cheskis, Harvey P.; and Watson, W. Gary, 4,709,746, Cl. 164-485.000.

Cheung, Kee K., to Chi Kuan Manufactory Limited. Vanity mirror assembly. 4,710,856, Cl. 362-74.000.

Chevron Research Company: *See*—
Buckley, Thomas F., 4,710,201, Cl. 44-63.000.
Lopez, Jaime; and Pasek, Eugene A., 4,710,486, Cl. 502-219.000.
Miller, Stephen J., 4,710,485, Cl. 502-213.000.

Chi Kuan Manufactory Limited: *See*—
Cheung, Kee K., 4,710,856, Cl. 362-74.000.

Chicago Show Printing Co.: *See*—
Barnett, Earl D., 4,709,891, Cl. 248-214.000.

Chikama, Toshio, to Kabushiki Kaisha Machida Seisakusho. Illuminating light supply system in electronic endoscope apparatus. 4,710,807, Cl. 358-98.000.

Chiolle, Antonio: *See*—
Credali, Lino; Corsi, Gianfranco; and Chiolle, Antonio, 4,710,336, Cl. 264-171.000.

Chisso Corporation: *See*—
Tabata, Nobuchika; and Fukumitsu, Shohji, 4,710,317, Cl. 252-609.000.

Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., to W. R. Grace & Co. Dipeptides and process. 4,710,583, Cl. 560-40.000.

Chow, Wai Y.: *See*—
McAlpin, James J.; and Chow, Wai Y., 4,710,540, Cl. 525-101.000.

Christiansen, David W.; and Karnesky, Richard A., to United States of America, Energy. Nuclear breeder reactor fuel element with silicon carbide getter. 4,710,343, Cl. 376-414.000.

Christie, Richard D.: *See*—
Gross, Anthony E.; Christie, Richard D.; and Pinder, Thomas E., 4,710,285, Cl. 209-166.000.

Christodoulou, Leontios: *See*—
Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 4,710,348, Cl. 420-129.000.

Christopher, T. Graham. Urinary catheter with collapsible urethral tube. 4,710,169, Cl. 604-104.000.

Chrysler Motors Corporation: *See*—
Metz, Marcus C., 4,709,776, Cl. 180-281.000.
Metz, Marcus C., 4,709,777, Cl. 180-286.000.

Chu, Richard C.; and Simons, Robert E., to International Business Machines Corp. Heat transfer element with nucleate boiling surface and bimetallic fin formed from element. 4,709,754, Cl. 165-133.000.

Chum, Stanley, to GTE Sprint Communications Corp. Local and remote bit error rate monitoring for early warning of fault location of digital transmission system. 4,710,924, Cl. 371-4.000.

Chupp, Vernon L., to Becton, Dickinson and Company. Dual laser excitation from single laser source. 4,710,635, Cl. 250-461.200.

Cianfarani, Vincent: *See*—
Bongiovanni, Nicola; and Cianfarani, Vincent, 4,709,887, Cl. 248-66.000.

Ciba-Geigy Corporation: *See*—
Beffa, Fabio; and Schutz, Hans U., 4,710,198, Cl. 8-437.000.
Pischky, Hans, 4,710,220, Cl. 71-67.000.

Cimsa Sintra (S.A.): *See*—
Mouchotte, Daniel G. E., 4,710,617, Cl. 235-487.000.

Cinqualbre, Paul-Henri. Method and apparatus for displaying particle sedimentation rates in liquids. 4,710,874, Cl. 364-413.000.

Clarion Co., Ltd.: *See*—
Tazaki, Satoru, 4,710,958, Cl. 381-10.000.

Clark, Dean. Bowlers grip exerciser. 4,709,916, Cl. 272-67.000.

Clark, Kenneth R.: *See*—
Kelly, John E.; Jones, Don C.; Tuck, Frederick R.; Zimmermann, William A.; and Clark, Kenneth R., 4,710,031, Cl. 356-440.000.

Clark, Stephen C., to Strippit/Di-Acro-Houdaille, Inc. Method of working sheet material workpieces by a sheet material working machine tool. 4,709,605, Cl. 83-23.000.

Clauss, Hermann: *See*—
Waschler, Eckehard; Clauss, Hermann; and Hefner, Heinz-Achim, 4,710,264, Cl. 437-228.000.

Clement, Gilles; and Villedieu, Eric, to Commissariat a l'Energie Atomique. Variable geometry track vehicle. 4,709,773, Cl. 180-9.320.

Cline, Harvey E.; and Lorensen, William E., to General Electric Company. System and method for the display of surface structures contained within the interior region of a solid body. 4,710,876, Cl. 364-414.000.

Cline, Thomas L., to Corra-Board Products Co., Inc. Game board construction. 4,709,927, Cl. 273-286.000.

Cline, Thomas L., to Corra-Board Products Co., Inc. Paperboard panel construction. 4,710,417, Cl. 428-182.000.

Coastal Engineered Products Company, Inc.: *See*—
Coll, Gene P.; and Leonardo, Ignazio, 4,709,980, Cl. 350-96.200.

Coca-Cola Company: *See*—
Kruger, Manfred; and Mucha, Lawrence S., 4,709,835, Cl. 222-87.000.
Rudick, Arthur G.; and Credle, William S., Jr., 4,709,734, Cl. 141-2.000.

Cocke, John; and Hailpern, Brent T., to International Business Machines Corporation. Interconnect scheme for shared memory local networks. 4,710,868, Cl. 364-200.000.

Cody, Charles A.: *See*—
Reichert, William W.; Cody, Charles A.; Desesa, Michael A.; and Faulseit, Bruce K., 4,710,404, Cl. 427-386.000.

Coe, Richard J., to Boeing Company, The. Parasitically coupled, complementary slot-dipole antenna element. 4,710,775, Cl. 343-727.000.

Coll, Gene P.; and Leonardo, Ignazio, to Coastal Engineered Products Company, Inc. Buried-cable junction enclosure with cable-storage vault. 4,709,980, Cl. 350-96.200.

Collart, Johannes A., to P. J. Zweegers en Zonen, B.V. Mowing device. 4,709,540, Cl. 56-13.600.

Collins, Francis: *See*—
Weissman, Sherman M.; and Collins, Francis, 4,710,465, Cl. 435-91.000.

Collins, Nancy: *See*—
Dupont, Bo; Morishima, Yasuo; Collins, Nancy; Ogata, Shunichiro; and Lloyd, Kenneth O., 4,710,457, Cl. 435-7.000.

Colorado State University Research Foundation: *See*—
Macy, Dennis W., 4,710,370, Cl. 424-9.000.

Colorization Inc.: *See*—
Markle, Wilson; and Mitchell, Christopher, 4,710,805, Cl. 358-81.000.

Columbia University in the City of New York: *See*—
Czarnul, Zdzislaw, 4,710,726, Cl. 330-69.000.

Combustion Engineering, Inc.: *See*—
Barto, Ronald J.; Goodstine, Stephen L.; and Noto, Frank A., 4,709,664, Cl. 122-379.000.

Commercial Shearing, Inc.: *See*—
Williams, Arthur, 4,709,724, Cl. 137-596.000.

Commissariat a l'Energie Atomique: *See*—
Clement, Gilles; and Villedieu, Eric, 4,709,773, Cl. 180-9.320.

Communication Devices, Inc.: *See*—
Kelly, Robert J.; and Kelly, Tadhg, 4,710,929, Cl. 371-22.000.

Compagnie General d'Electricite: *See*—
Robieux, Jean, 4,710,914, Cl. 370-3.000.

Compagnie Generale des Etablissments Michelin: *See*—
Charvet, Jean-Louis, 4,709,544, Cl. 57-218.000.

Compo Industries, Inc.: *See*—
Slosberg, David K.; and Nowell, Gilbert S., 4,710,415, Cl. 428-48.000.

Compression Labs, Inc.: *See*—
Wallis, Robert H.; and Pratt, William K., 4,710,813, Cl. 358-136.000.

Conagra, Inc.: *See*—
Kirn, Jeffrey F.; and Connaughton, James M., Jr., 4,710,391, Cl. 426-289.000.

Condolios, Elie, to Alsthom. Two-stage apparatus for clarifying liquid charged with solid matter. 4,710,291, Cl. 210-199.000.

Conea, Christopher A.: *See*—
Cristescu, Alex G.; and Conea, Christopher A., 4,709,463, Cl. 29-566.300.

Conelly, Elizabeth Y. Mobile clean-up device. 4,709,440, Cl. 15-257.300.

Conforto, Peter M.: *See*—
Olsen, Peter C., Jr.; Conforto, Peter M.; Craighead, Jimmy R.; and Wolf, David L., 4,709,538, Cl. 53-566.000.

Connaughton, James M., Jr.: *See*—
Kirn, Jeffrey F.; and Connaughton, James M., Jr., 4,710,391, Cl. 426-289.000.

Connell, Lawrence E.; and Webb, Ronald J., to Motorola, Inc. Differential CMOS comparator for switched capacitor applications. 4,710,724, Cl. 330-9.000.

Connolly, James D. Static sieve feed control. 4,710,296, Cl. 210-420.000.

Conoco Inc.: *See*—
Allison, Joe D.; and Wimberley, J. W., 4,710,305, Cl. 210-747.000.

Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, to Daimler-Benz Aktiengesellschaft. Arrangement of a soot filter in the exhaust gas system of an internal combustion engine with an exhaust gas turbocharger. 4,709,548, Cl. 60-280.000.

Consolidated Devices, Inc.: *See*—
Grabovac, Bosko; and Kurtovic, Zlatko, 4,709,602, Cl. 81-483.000.

Consortium fur Elektrochemische Industrie GmbH: *See*—
Hafner, Walter; Ritter, Peter; Gebauer, Helmut; and Regiert, Marlies, 4,710,316, Cl. 512-20.000.

Conticelli, Carlo: *See*—
Bianchi, Valerio; and Conticelli, Carlo, 4,709,674, Cl. 123-339.000.

Continental Conveyor & Equipment Co., Inc.: *See*—
Bodovsky, Paul W.; and Rodgers, Donald H., 4,710,207, Cl. 55-290.000.

Continental PET Technologies, Inc.: *See*—
Krishnakumar, Suppayan M.; and Nahill, Thomas E., 4,710,118, Cl. 425-130.000.

Cooley, Edward J.; and Shaw, Franklin D., to Platt Saco Lowell Corporation. Method and means of coiling start-up which prevents sliver slingover. 4,709,452, Cl. 19-159.00R.

Cooley, John. Sheetrock hanging tool. 4,709,527, Cl. 52-749.000.

Cooper Industries, Inc.: *See*—
Frawley, Lanny J., 4,710,140, Cl. 439-733.000.

Copal Company Limited: *See*—
Kohno, Takanori, 4,710,014, Cl. 354-427.000.

Copeland, Henry; and Copeland, Steve M. Wet sandblasting system. 4,709,515, Cl. 51-436.000.

Copeland, Steve M.: *See*—
Copeland, Henry; and Copeland, Steve M., 4,709,515, Cl. 51-436.000.

Coplan, Myron J., to Albany International Corporation. Threaded end enclosure. 4,709,831, Cl. 220-304.000.

Corbo, Andrea M.: *See*—
Boyle, William J., Jr.; Mares, Frank; and Corbo, Andrea M., 4,710,545, Cl. 525-340.000.

Cordery, Robert A., to Pitney Bowes Inc. Apparatus and method for detecting a magnetic marker. 4,710,752, Cl. 340-551.000.

Cordes, Hugo; and Kroger, Hans. Operating arm for an earth-moving and foundation machine. 4,709,588, Cl. 74-103.000.

Corne, Robert W.; and Hagger, John M. R., to BICC Public Limited Company. Gelled oil filling compounds. 4,709,982, Cl. 350-96.230.

Cornell Research Foundation, Inc.: *See*—
Meister, Alton, 4,710,489, Cl. 514-18.000.

Cornibert, Jacques: *See*—
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., 4,710,594, Cl. 174-120.0SR.

Cornils, Boy: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,710,321, Cl. 200-501.150.

Corning Glass Works: *See*—
Bailey, Lorraine F.; and Bennett, Richard J., 4,710,217, Cl. 65-31.000.
Borrelli, Nicholas F.; Hares, George B.; Smith, Dennis W.; and Wedding, Brent M., 4,710,430, Cl. 428-432.000.

Corra-Board Products Co., Inc.: *See*—
Cline, Thomas L., 4,709,927, Cl. 273-286.000.
Cline, Thomas L., 4,710,417, Cl. 428-182.000.

Corrigan, John J.: *See*—
Szkaradek, Edward J.; and Corrigan, John J., 4,709,863, Cl. 241-69.000.

Corrpro Companies, Inc.: *See*—
Baach, Michael K., 4,710,644, Cl. 307-95.000.

Cors, Craig M.; and Kadlubowski, Joseph C., to Harper-Wyman Company. Electric/gas oven thermostat. 4,710,742, Cl. 337-323.000.

Corsi, Gianfranco: *See*—
Credali, Lino; Corsi, Gianfranco; and Chiolle, Antonio, 4,710,336, Cl. 264-171.000.

Cortelyou, David H., Jr. Window paint scraper. 4,709,478, Cl. 30-169.000.

Cosgrove, John: *See*—
Oliver, Stewart W.; and Cosgrove, John, 4,710,919, Cl. 370-96.000.

Costanzo, Phillip A.: *See*—
Ward, Thomas H.; Costanzo, Phillip A.; Pietrasz, Vincent; and Soeder, Edmund J., 4,710,344, Cl. 419-8.000.

Cottage Industries (Equestrian) Limited: *See*—
Bird, Elizabeth A., 4,709,539, Cl. 54-23.000.

Courtesy Mold & Tool Corporation: *See*—
Kreiseder, Walter J., 4,709,830, Cl. 220-258.000.

Cox, Frederick E.; Rink, Frederick J., Jr.; and Valachovic, Richard A., to General Electric Company. Space block control means for dynamoelectric machine. 4,710,664, Cl. 310-217.000.

Coyne & Delany Co.: *See*—
Laverty, Martin J., Jr., 4,709,427, Cl. 4-427.000.

Crabtree, Luther L.: *See*—
Pelchat, Guy; and Crabtree, Luther L., 4,710,723, Cl. 329-192.000.

Cragin, Glynn P., Jr.: *See*—
Bradfield, Ganey W.; and Cragin, Glynn P., Jr., 4,709,880, Cl. 244-12.500.

Cragoe, Edward J., Jr.: *See*—
Willard, Alvin K.; Novello, Frederick C.; Hoffman, William F.; and Cragoe, Edward J., Jr., 4,710,513, Cl. 514-460.000.

Craig Medical Products Ltd.: *See*—
Steer, Peter L., 4,710,183, Cl. 604-344.000.

Craighead, Jimmy R.: *See*—
Olsen, Peter C., Jr.; Conforto, Peter M.; Craighead, Jimmy R.; and Wolf, David L., 4,709,538, Cl. 53-566.000.

Cramer, Barry G.; and Cramer, Roy A., to Air-O-Lator Corporation. Aspirating aeration and liquid mixing apparatus. 4,710,325, Cl. 261-24.000.

Cramer, Roy A.: *See*—
Cramer, Barry G.; and Cramer, Roy A., 4,710,325, Cl. 261-24.000.

Credali, Lino; Corsi, Gianfranco; and Chiolle, Antonio, to Montedison S.p.A. Process for preparing two-component synthetic fibers suited for replacing cellulose fibers. 4,710,336, Cl. 264-171.000.

Credle, William S., Jr.: *See*—
Rudick, Arthur G.; and Credle, William S., Jr., 4,709,734, Cl. 141-2.000.

Cremosnik, Gregor; Timper, Joachim; and Holzberger, Johann, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Apparatus for guiding a missile. 4,709,875, Cl. 244-3.130.

Crill, Philip D.; and Rubin, Michael D., to Ford Aerospace & Communications Corporation. r.f. Phase modulator. 4,710,733, Cl. 332-26.000.

Crist, Wilmer W.; and Firmin, Dan. Cementing tool. 4,709,760, Cl. 166-285.000.

Cristescu, Alex G.; and Conea, Christopher A., to Northern Telecom Limited. Apparatus for connecting conductors to terminals of a cross-connect connector for communication lines. 4,709,463, Cl. 29-566.300.

Crochet, Gerard: *See*—
De Paepe, Thijlbert; and Crochet, Gerard, 4,709,583, Cl. 73-861.170.

Croft, John E. Aperture seal for a roof mounted ventilator and method for making same. 4,709,624, Cl. 98-119.000.

Cron, Alain: *See*—
Periard, Jacques; and Cron, Alain, 4,710,307, Cl. 252-18.000.

Crouzet: *See*—
Fima, Henri; and Janiaud, Denis, 4,710,668, Cl. 310-323.000.

Crudele, Lester M.: *See*—
Zolnowsky, John; Crudele, Lester M.; and Spak, Michael E., 4,710,866, Cl. 364-200.000.

Crumby, John T., to Crumby, John T. Mortar application template. 4,709,526, Cl. 52-749.000.

Csanady, Michael, Jr., to Westinghouse Electric Corp. Retrofit friction-hydrostatic emergency lubrication system for a large rotating shaft. 4,709,785, Cl. 184-6.400.

Csizer, Eva: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Cubbage, William: *See*—
Perdue, Terry A.; and Cubbage, William, 4,710,137, Cl. 439-457.000.

Cubit, Harry T.; and Johnson, George C., to T. J. Cope, Inc. Hanger apparatus for electrical conduit and the like. 4,709,888, Cl. 248-73.000.

Cucinella, Salvatore: *See*—
Carbonaro, Antonio; Gordini, Silvano; and Cucinella, Salvatore, 4,710,553, Cl. 526-142.000.
Dozzi, Giovanni; Della Fortuna, Giorgio; and Cucinella, Salvatore, 4,710,531, Cl. 524-239.000.

Cucinotta, Luigi; and Di Benedetto, Orazio, to Automotive Products plc. Clutch driven plate. 4,709,797, Cl. 192-106.200.

Cunningham, Richard M.: *See*—
Kulp, Jack H.; and Cunningham, Richard M., 4,710,053, Cl. 404-9.000.

Curda, Otakar; Maxa, Jaroslav; and Uhlir, Pavel, to Elitex koncern textilniho strojirenstvi. Thread movement sensor. 4,710,646, Cl. 307-116.000.

Curran, Earl J., Jr.: *See*—
Libert, James T.; and Curran, Earl J., Jr., 4,710,692, Cl. 318-729.000.

Curtis, Gerald J. Sealed and secured fastener. 4,710,082, Cl. 411-373.000.

Cutts, William H.: *See*—
Seydel, Scott O.; and Cutts, William H., 4,710,396, Cl. 427-8.000.

Czarnul, Zdzislaw, to Columbia University in the City of New York. Semiconductive MOS resistance network. 4,710,726, Cl. 330-69.000.

Czich, Erhard; Drott, Peter; and Haefner, Horst, to Alfred Teves GmbH. Dust cover for cylindrical elements of the type for use in a pin guide arrangement of a spot-type disc brake. 4,709,789, Cl. 188-73.440.

Dack, Stuart W.: *See*—
Yates, David E.; and Dack, Stuart W., 4,710,248, Cl. 149-21.000.

Daems, Eddie R.: *See*—
Leenders, Luc H.; Daems, Eddie R.; and Van den Bogaert, Jan A., 4,710,444, Cl. 430-237.000.

Dahlen, Rolf: *See*—
Faktus, Eskil; and Dahlen, Rolf, 4,710,063, Cl. 405-269.000.

Dahlquist, Art: *See*—
Peters, Douglas C.; and Hansen, Charles S., 4,709,955, Cl. 296-3.000.

Dahm, Christian: *See*—
Tittizer, Gabriel; Junghans, Ewald; Bestenreiner, Georg; and Dahm, Christian, 4,710,034, Cl. 384-110.000.

Daimler-Benz AG: *See*—
Paerisch, Jochen; Herlemann, Werner; and Schaetzler, Walter, 4,709,959, Cl. 296-217.000.

Daimler-Benz Aktiengesellschaft: *See*—
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Okoshi, Noboru; Motomura, Masatoshi; Ohtsubo, Mitsuru; and Ikeda, Takenori, 4,710,230, Cl. 106-308.00N.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Kitazawa, Yoshihiro, 4,710,823, Cl. 358-280.000.

Dale (Mansfield) Limited: *See*—
Dring, Eric, 4,710,104, Cl. 417-53.000.

Dalton, Claude W.: *See*—
Flora, John H.; Womack, Robert E.; Stinnett, Carlton E.; and Dalton, Claude W., 4,710,710, Cl. 324-220.000.

Dambkes, Heinrich; Herzog, Hans-J.; and Jorke, Helmut, to Licentia Patent-Verwaltungs-GmbH. Modulation doped field effect transistor with doped Si_yGe_{1-x-y} intrinsic Si layering. 4,710,788, Cl. 357-22.000.

Dana Corporation: *See*—
Hennon, Erin D.; and Keller, Thomas J., 4,710,038, Cl. 384-569.000.

D'Andrea, Ermanno; and D'Andrea, Nicola, to D'Andrea S.p.A. Milling and drilling head for a machine tool. 4,709,455, Cl. 29-40.000.

D'Andrea, Nicola: *See*—
D'Andrea, Ermanno; and D'Andrea, Nicola, 4,709,455, Cl. 29-40.000.

D'Andrea S.p.A.: *See*—
D'Andrea, Ermanno; and D'Andrea, Nicola, 4,709,455, Cl. 29-40.000.

Daniels, David L.: *See*—
Hinch, Henry H.; Boyne, Gail E.; Daniels, David L.; and Kullmann, Eugene V., 4,710,946, Cl. 378-62.000.

Daniels, Martin D.: *See*—
Powell, Theo J.; Bellay, Jeffrey D.; Daniels, Martin D.; and Hwang, Yin-Chao, 4,710,933, Cl. 371-25.000.

Danilov, Boris B.: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.

Darrieux, Jean-Louis, to Societe Nationale Industrielle et Aerospatiale. Manufacture of frames. 4,710,412, Cl. 428-36.000.

Datapoint Corporation: *See*—
Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., 4,710,917, Cl. 370-62.000.

Daugherty, Charles W.: *See*—
Cartmell, Robert L.; Daugherty, Charles W.; and Ireland, David B., 4,710,175, Cl. 604-177.000.

Davey, Raymond G.; Dees, Martin, Jr.; and Sigman, Daniel M., Jr., to Armstrong World Industries, Inc. Method of printing a raised pattern of liquid. 4,709,631, Cl. 101-129.000.

David, Bernd; and Klingberg, Alfred, to Jungheinrich Unternehmensverwaltung KG. Industrial truck, particularly high-lift truck, also as a high-lift truck having a displaceable mast. 4,709,786, Cl. 187-9.00E.

Davies, Roy V.; and Fraser, James, to Boots Company PLC, The. Antihypertensive thienopyridines. 4,710,506, Cl. 514-301.000.

Davis, Gary W.: *See*—
Littleton, Jody; and Davis, Gary W., 4,709,719, Cl. 137-268.000.

Davis, Steven S., to Envirotech Corporation. Filter cloth cake removal device. 4,710,293, Cl. 210-225.000.

Davis, William F., to Motorola, Inc. Amplifier having improved gain-bandwidth product. 4,710,728, Cl. 330-252.000.

Davison, Dale, to Boehringer Mannheim Corporation. Adjustable drill gauge. 4,710,075, Cl. 408-202.000.

Davy McKee (Poole) Limited: *See*—
Ticehurst, Roy M.; and Watson, Joseph L., 4,709,568, Cl. 72-201.000.

Dawes, Cyril; and Tranter, Donald F., to Lucas Industries Public Limited Company. Making of steel component. 4,710,238, Cl. 148-16.600.

Dayton, Russell W.: *See*—
Saller, Henry A., deceased; Hodge, Edwin S.; Paprocki, Stanley J.; and Dayton, Russell W., 4,709,848, Cl. 228-159.000.

De La Rue Systems Ltd.: *See*—
Chapman, Victor B.; and Lacey, Paul D., 4,710,963, Cl. 382-7.000.
Jenkins, Stuart M.; Spencer, Michael S.; and Mayfield, Ross, 4,709,820, Cl. 209-534.000.

Debus, Walter, Jr.; Osborne, Thomas L.; and Siller, Curtis A., Jr., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Digital synthesis technique for pulses having predetermined time and frequency domain characteristics. 4,710,891, Cl. 364-718.000.

Decagny, Michel: *See*—
Fugier, Roger; de Goys de Mezerac, Charles; Joachim, Jacky; and Decagny, Michel, 4,710,406, Cl. 427-389.800.

Deere & Company: *See*—
Obel, Werner; and Zahn, Klaus, 4,709,941, Cl. 280-461.00A.

Dees, Martin, Jr.: *See*—
Davey, Raymond G.; Dees, Martin, Jr.; and Sigman, Daniel M., Jr., 4,709,631, Cl. 101-129.000.

Deetz, David W.; and Kreevoy, Maurice M., to Honeywell Inc. Stabilized liquid films. 4,710,205, Cl. 55-158.000.

DeFranco, Thomas P.: *See*—
Adamski, Alfred; DeFranco, Thomas P.; and Dougherty, Lawrence W., 4,710,669, Cl. 313-402.000.

Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, to Mitsui Engineering & Shipbuilding Co., Ltd. Method for melting Ti or a high-Ti alloy in CaO refractories. 4,710,481, Cl. 501-123.000.

de Goys de Mezerac, Charles: *See*—
Fugier, Roger; de Goys de Mezerac, Charles; Joachim, Jacky; and Decagny, Michel, 4,710,406, Cl. 427-389.800.

Deguchi, Hiroyuki: *See*—
Kawai, Katsunori; Kobayashi, Hisao; Deguchi, Hiroyuki; and Sugizono, Shuichi, 4,709,555, Cl. 62-228.300.

DEGUSSA Aktiengesellschaft: *See*—
Kaiser, Hasso, 4,710,224, Cl. 106-1.230.
Muller, Karl H.; and Barthel, Walter, 4,710,229, Cl. 106-281.00R.

Del Monte Corporation: *See*—
Liu, Yuan K., 4,710,388, Cl. 426-102.000.

Delco Electronics Corporation: *See*—
Young, William M.; and Wolfe, Mark E., 4,710,395, Cl. 427-8.000.

Deline, John R. M.: *See*—
Reid, Bruce A.; and Deline, John R. M., 4,710,690, Cl. 318-685.000.

Della Fortuna, Giorgio: *See*—
Dozzi, Giovanni; Della Fortuna, Giorgio; and Cucinella, Salvatore, 4,710,531, Cl. 524-239.000.

Del Priore, Paul J., to RCA Corporation. Test mask for determining alignment of an automatic IC mask testing apparatus. 4,710,440, Cl. 430-5.000.

del Rosario, Luis. Vehicle warning system. 4,710,745, Cl. 340-63.000.

DeLuca, Charles Q.; and Shiung, Huang J. Hydraulic hoist particularly for mounting on pick-up truck beds or the like. 4,710,090, Cl. 414-550.000.

Delvecchio, Robert M.: *See*—
McKee, Bobby D.; Cain, Michael P.; Delvecchio, Robert M.; and Aivaliotis, Emmanuel, 4,710,660, Cl. 310-178.000.

De Marchi, Jean-Louis: *See*—
Morell, Joseph; De Marchi, Jean-Louis; and Kopp, Norbert, 4,709,491, Cl. 36-121.000.

Demeyer, Pierre, to Merlin Gerin S.A. Circuit breaker with solid-state trip unit with sampling and latching at the last signal peak. 4,710,845, Cl. 361-96.000.

Denda, Toshio, to Teraoka Seiko Co., Ltd. Stretch film packaging machine. 4,709,531, Cl. 53-415.000.

Den Dunne, Margaret S.: *See*—
Luckey, George W.; Roth, Bernard; Brendel, Kathleen E.; and Den Dunne, Margaret S., 4,710,637, Cl. 250-486.100.

Denning Mobil Robotics, Inc.: *See*—
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., 4,710,020, Cl. 356-1.000.

Dennis, Richard K. Method and mechanism to deposit solder paste upon substrates. 4,710,399, Cl. 437-245.000.

Dennis, Timothy A., to RCA Corporation. Apparatus and method for maintaining a uniform etching solution composition. 4,710,261, Cl. 156-626.000.

Dennison, William G., to Eaton Corporation. Electromagnetic operator for a contactor with improved shock pad. 4,710,740, Cl. 335-248.000.

Denton, Peter R.: *See*—
Singh, Bawa; and Denton, Peter R., 4,710,283, Cl. 204-298.000.

Denton Vacuum Inc.: *See*—
Singh, Bawa; and Denton, Peter R., 4,710,283, Cl. 204-298.000.

De Paepe, Thijlbert; and Crochet, Gerard, to Sereg. Electromagnetic flow meter using a pulsed magnetic field. 4,709,583, Cl. 73-861.170.

Dermatalogical Products of Texas: *See*—
Bordovsky, Michael J.; and Feik, John W., 4,709,712, Cl. 132-7.000.

DeRossett, Edmund Z.; and Luceri, Thomas J., to Personal Products Company. Clean and dry appearance facing. 4,710,186, Cl. 604-383.000.

Deseret Medical, Inc.: *See*—
Cartmell, Robert L.; Daugherty, Charles W.; and Ireland, David B., 4,710,175, Cl. 604-177.000.

Desesa, Michael A.: *See*—
Reichert, William W.; Cody, Charles A.; Desesa, Michael A.; and Faulseit, Bruce K., 4,710,404, Cl. 427-386.000.

deSolms, Jane: *See*—
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., 4,710,504, Cl. 514-267.000.

des Ordons, Jacques R.: *See*—
Grenier, Gilles; Maffert, Jerome; Merle, Jean-Pierre; and des Ordons, Jacques R., 4,710,028, Cl. 356-375.000.

de Tavares, Joaquim. Toothbrush with gravity switch. 4,709,438, Cl. 15-167.00A.

Deutsch, Ida: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Deutsche Forschungs-und Versuchsanstalt fur Luft- und Raumfahrt e.V.: *See*—
Ries, Joachim; and Dorgeloh, K. Heinrich W., 4,710,809, Cl. 358-109.000.

Deutsche ITT Industries GmbH: *See*—
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, 4,710,814, Cl. 358-143.000.

Deutsche Thomson-Brandt GmbH: *See*—
Rilly, Gerard, 4,710,859, Cl. 363-21.000.

Devaney, Mark J.: *See*—
Slater, Daniel A.; Meredith, William A.; and Devaney, Mark J., 4,710,352, Cl. 422-63.000.

Develco: *See*—
Rorden, Louis H.; and Moore, Thomas C., 4,710,708, Cl. 324-207.000.

DeVos, Jerry, to Atara Corporation. Digester tank with foam control cover. 4,710,292, Cl. 210-218.000.

Dhein, Rolf: *See*—
Meier, Helmut-Martin; Heine, Hans-Georg; Pischtschan, Alfred; Dhein, Rolf; and Rudolph, Hans, 4,710,529, Cl. 524-139.000.

Di Benedetto, Orazio: *See*—
Cucinotta, Luigi; and Di Benedetto, Orazio, 4,709,797, Cl. 192-106.200.

Dick, P. R. Pharmaceutical dermal compositions with prolonged and continuous action based on essential fatty acids. 4,710,383, Cl. 424-449.000.

Didier-Werke AG: *See*—
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, 4,710,480, Cl. 501-95.000.
Winkelmann, Manfred; Muschner, Udo; and Gerber, Pierre, 4,709,905, Cl. 266-270.000.

Diebold, Incorporated: *See*—
Anders, Walter G.; Grosswiller, Leo J., Jr.; Lozier, Benjamin F.; and Rozlosnik, Alan J., 4,710,098, Cl. 415-149.00A.

DiEgidio, Leo C. Electoral college game. 4,709,926, Cl. 273-257.000.

DigiRad Corporation: *See*—
Alvarez, Robert; Lehmann, Leonard; and Strul, Bruno, 4,710,624, Cl. 250-228.000.

DiGiulio, Peter C.; and Stalzer, Henry, to Pitney Bowes Inc. Electronic postage meter having a nonvolatile memory selection means. 4,710,882, Cl. 364-464.000.

Dimier, Jean-Pierre; and Rullier, Pierre, to Salomon S.A. Safety ski binding including an automatic compensation mechanism. 4,709,942, Cl. 280-618.000.

Dinsky, Seth: *See*—
Barouh, Victor; and Dinsky, Seth, 4,710,047, Cl. 400-697.000.

Disko, Harry: *See*—
Rasmussen, Russell G.; Stubenfoll, Leonard J.; and Disko, Harry, 4,710,146, Cl. 446-308.000.

Disser, Robert J.: *See*—
Lehnhoff, Richard N.; and Disser, Robert J., 4,710,685, Cl. 318-287.000.

Dixon, John R.: *See*—
Koehler, Heinrich P.; and Dixon, John R., 4,710,071, Cl. 408-133.000.

Djordjevic, Ilija; and Ganser, Marco, to Stanadyne, Inc. Modular accumulator injector. 4,709,679, Cl. 123-447.000.

Dobruskin, Moisey: *See*—
Chak, Maryan; and Dobruskin, Moisey, 4,710,282, Cl. 204-228.000.

Dr. Ing.h.c.F. Porsche Aktiengesellschaft: *See*—
Ampferer, Herbert, 4,709,670, Cl. 123-195.00C.
von Sivers, Rolf, 4,709,778, Cl. 180-292.000.

Doddapaneni, Narayan, to Honeywell Inc. High rate metal oxyhalide cells. 4,710,437, Cl. 429-101.000.

Dohi, Takashi: *See*—
Neki, Shigeo; Ohara, Kenichi; Shibata, Nobuho; and Dohi, Takashi, 4,710,688, Cl. 318-603.000.

Doi, Hajime: *See*—
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, 4,709,816, Cl. 206-444.000.

Doi, Yoshihiko; Kuroishi, Nobuhito; Ochi, Shigeki; and Uenishi, Noboru, to Japan as represented by Director-General, Agency of Industrial Science & Technology. Manufacturing method of superheat-resisting alloy material. 4,710,345, Cl. 419-28.000.

Doittau, Pierre O.; and Moal, Herve , to Matra. Device for monitoring the state of an electric switch or an electric relay. 4,710,645, Cl. 307-115.000.

Dolan, John E. Automatic toilet bowl cleaner device. 4,709,424, Cl. 4-228.000.

Dolhyj, Serge R.; Shaw, Wilfrid G.; and Pepera, Marc A., to Standard Oil Company, The. Method for preparing a supported mixed-metal oxide oxidation catalyst. 4,710,484, Cl. 502-208.000.

Dollard, Walter J.; Doshi, Pratap K.; and George, Raymond A., to Westinghouse Electric Corp. Mechanical spectral shift reactor. 4,710,340, Cl. 376-209.000.

Donn, Anthony; and Koester, Charles J. Intraocular-external lens combination system and method of using same. 4,710,197, Cl. 623-6.000.

Donohue, John, to Becton, Dickinson and Company. High energy radiation stabilization of semi-crystalline polymers. 4,710,524, Cl. 522-75.000.

Dorgeloh, K. Heinrich W.: *See*—
Ries, Joachim; and Dorgeloh, K. Heinrich W., 4,710,809, Cl. 358-109.000.

Dornow, Karl-Dietrich. Method and apparatus for controlling peeling machines for peeling fruit or vegetables. 4,710,389, Cl. 426-231.000.

Doro, Guilio: *See*—
Roederer, Antoine G.; Doro, Guilio; and Lisi, Marco, 4,710,776, Cl. 343-778.000.

Dorsey, Robert T.: *See*—
Borchardt, Michael G.; Dorsey, Robert T.; and Kamp, Ewald A., 4,710,968, Cl. 383-63.000.

Dosaka, Katsumi: *See*—
Kumanoya, Masaki; Fujishima, Kazuyasu; and Dosaka, Katsumi, 4,710,901, Cl. 365-190.000.

Doshi, Pratap K.: *See*—
Dollard, Walter J.; Doshi, Pratap K.; and George, Raymond A., 4,710,340, Cl. 376-209.000.

Doty, Francis D., to Doty Scientific, Inc. High voltage capacitor wand for high power tuned circuits. 4,710,719, Cl. 324-318.000.

Doty Scientific, Inc.: *See*—
Doty, Francis D., 4,710,719, Cl. 324-318.000.

Dotzauer, Peter; and Schmidt, Martin, to Siemens Aktiengesellschaft. Cooling system for relatively movable components. 4,709,559, Cl. 62-499.000.

Dougherty, Lawrence W.; and Fendley, James R., to Zenith Electronics Corporation. Front assembly system for a tension mask color cathode ray tube. 4,710,670, Cl. 313-407.000.

Dougherty, Lawrence W.: *See*—
Adamski, Alfred; DeFranco, Thomas P.; and Dougherty, Lawrence W., 4,710,669, Cl. 313-402.000.

Douglas, Peter G.; and Kyffin, Morris N., to Independent Broadcasting Authority. Apparatus for improving the linearity of TV transmitters using a klystron. 4,710,815, Cl. 358-186.000.

Douglass, Harold E., Jr.; and Mahaffee, Joseph W., III, to United States of America, National Security Agency. Pneumatic audio sweep generator. 4,709,652, Cl. 116-140.000.

Dow Chemical Company, The: *See*—
Bogan, Gary W.; Lucas, Peter A.; Monnerat, Georgia A.; and Aldrich, Dale J., 4,710,429, Cl. 428-417.000.
Byrne, Joseph B., 4,710,548, Cl. 525-439.000.
Harley, A. Dale; Duquette, Lawrence G.; Khoury, Issam A.; and Kohatsu, Iwao, 4,710,227, Cl. 106-193.00R.

Dow Chemical Handels-und Vertriebsgesellschaft mbH: *See*—
Quack, Wolfgang, 4,710,413, Cl. 428-36.000.

Dow Corning Corporation: *See*—
Graiver, Daniel; and Kalinowski, Robert E., 4,710,405, Cl. 427-387.000.

Downs, David A.: *See*—
Bergmeier, Stephen C.; Downs, David A.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,710,508, Cl. 514-357.000.

Doyen, Daniel; and Vriz, Tarcisio, to U.S. Philips Corporation. Microwave oscillator comprising a dielectric resonator insensitive to mechanical vibrations. 4,710,729, Cl. 331-96.000.

Doyle, Francis S.; and France, Randall W., to American Telephone and Telegraph Company AT&T Information Systems. Telephone set line switch. 4,710,954, Cl. 379-427.000.

Doyle, Joseph E., III, to Motorola, Inc. Dsta clock oscillator having accurate duty cycle. 4,710,730, Cl. 331-116.0FE.

Dozzi, Giovanni; Della Fortuna, Giorgio; and Cucinella, Salvatore, to Anic, S.p.A. Self-extinguishing polycarbonate composition. 4,710,531, Cl. 524-239.000.

Dr.Ing.h.c.F. Porsche Aktiengesellschaft: *See—*
Rutschmann, Erwin; Tran-Van, Khanh; and Wagner, Joachim, 4,709,552, Cl. 60-600.000.
Weiner, Hans, 4,710,720, Cl. 324-550.000.

Drackett Company, The: *See—*
Richards, Randall G., 4,709,423, Cl. 4-228.000.

Dresser Industries, Inc.: *See—*
Patel, Arvind D.; and Salandanan, Carmelita S., 4,710,586, Cl. 560-68.000.
Scruggs, David M., 4,710,235, Cl. 148-4.000.

Dring, Eric, to Dale (Mansfield) Limited. Variable displacement fluid pump with transducer interface. 4,710,104, Cl. 417-53.000.

Dromigny, Pierre; and Schottli, Theodore, to Dromigny, Pierre. System for feeding film, forming a partial coating at least of a molded object, into a mold. 4,710,116, Cl. 425-125.000.

Drott, Peter: *See—*
Czich, Erhard; Drott, Peter; and Haefner, Horst, 4,709,789, Cl. 188-73.440.

Dubief, Claude: *See—*
Grollier, Jean F.; and Dubief, Claude, 4,710,374, Cl. 424-61.000.

Dubois, Jean-Marie: *See—*
Le Caer, Gerard; and Dubois, Jean-Marie, 4,710,246, Cl. 148-403.000.

Dubois, Marcel; and Fagard, Pierre, to Societe Francaise d'Equipements pour la Navigation Aerienne. Device for displaying symbols by means of a liquid crystal matrix. 4,710,766, Cl. 340-784.000.

Dudley, Robert H.: *See—*
Areaux, Larry D.; and Dudley, Robert H., 4,710,126, Cl. 432-58.000.

Duley, Raymond S.; and Forth, Leslie, to Advanced Micro Devices, Inc. Starlan coded data transceiver collision detection circuit. 4,710,943, Cl. 375-7.000.

Duncan, Robert; and Widener, Wade H., to Westinghouse Electric Corp. Retention strap in a grid assembly fixture. 4,709,909, Cl. 269-41.000.

Dunn, Jerry G.: *See—*
FitzPatrick, John R.; Dunn, Jerry G.; and Avens, Larry R., 4,710,222, Cl. 75-84.10R.

Duperon Corporation: *See—*
Duperon, Terry L., 4,709,804, Cl. 198-719.000.

Duperon, Terry L., to Duperon Corporation. Self-cleaning trash rack. 4,709,804, Cl. 198-719.000.

Duphar International Research B.V.: *See—*
Brouwer, Marius S.; and Grosscurt, Arnoldus C., 4,710,516, Cl. 514-594.000.

Dupont, Bo; Morishima, Yasuo; Collins, Nancy; Ogata, Shun-ichiro; and Lloyd, Kenneth O., to Sloan-Kettering Institute for Cancer Research. Monoclonal antibody for human hematopoietic glycoproteins and method. 4,710,457, Cl. 435-7.000.

Du Pont de Nemours, E. I., and Company: *See—*
Arduengo, Anthony J., 4,710,576, Cl. 556-40.000.
Chattha, Mohinder S.; and Theodore, Ares N., 4,710,543, Cl. 525-161.000.
Hillemann, Craig L., 4,710,221, Cl. 71-93.000.
Lee, Duk-Hi; Feierberg, Susan E.; and Mayer, Patricia, 4,710,319, Cl. 252-646.000.
Weed, Gregory C., 4,710,262, Cl. 156-630.000.
Wolfe, James R., Jr., 4,710,544, Cl. 525-194.000.

Dupont, Jean-Marcel: *See—*
Lebas, Jean-Marie; Rat, Pierre; Dupont, Jean-Marcel; and Vinuesa, Germain, 4,710,329, Cl. 264-3.100.

Duquette, Lawrence G.: *See—*
Harley, A. Dale; Duquette, Lawrence G.; Khoury, Issam A.; and Kohatsu, Iwao, 4,710,227, Cl. 106-193.00R.

Durr, Charles A.: *See—*
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., 4,710,214, Cl. 62-28.000.

D'Ussel, Louis: *See—*
Leben, Yannick; and D'Ussel, Louis, 4,710,438, Cl. 429-119.000.

Dyakov, Nikola G.; Guguchkova-Yanchuleva, Pravoslava T.; and Benchev, Dimiter V., to V T P "Maimex". Intraocular crystalline lens. 4,710,196, Cl. 623-6.000.

Dyhr, Einar. Choke valve especially used in oil and gas wells. 4,709,900, Cl. 251-5.000.

Dykes, Robert M.: *See—*
Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 4,709,447, Cl. 17-1.00F.

Dyvik, Froystein; and Mioen, Thomas K., to Boliden Aktiebolag. Method for manufacturing zinc hydrometallurgically. 4,710,277, Cl. 204-119.000.

E.C.H. Will (GmbH & Co.): *See—*
Ladewig, Dieter; and Ramcke, Bernd, 4,710,256, Cl. 156-484.000.

East/West Industries, Inc.: *See—*
Spinosa, Dominic J.; and Knoll, Frank, 4,709,818, Cl. 206-524.800.

Eastman Kodak Company: *See—*
Caine, Holden; and Brownstein, Scott A., 4,710,783, Cl. 346-76.0PH.
LaBudde, Brian R.; and Koek, Kevin C., 4,709,972, Cl. 312-208.000.
Luckey, George W.; Roth, Bernard; Brendel, Kathleen E.; and Den Dunne, Margaret S., 4,710,637, Cl. 250-486.100.
Mills, Borden H., 4,710,785, Cl. 346-153.100.
Raychaudhuri, Pranab K., 4,710,452, Cl. 430-495.000.
Slater, Daniel A.; Meredith, William A.; and Devaney, Mark J., 4,710,352, Cl. 422-63.000.
Stephenson, Stanley W., 4,710,781, Cl. 346-76.0PH.
Warren, David P., 4,710,557, Cl. 526-289.000.
Wong, Wai C., 4,710,006, Cl. 354-204.000.

Eaton Corporation: *See—*
Dennison, William G., 4,710,740, Cl. 335-248.000.
Richards, Elmer A., 4,709,590, Cl. 74-331.000.
Sabroff, Alvin M.; Chambers, Samuel C.; and Ream, James C., 4,709,569, Cl. 72-340.000.

Ebara Corporation: *See—*
Hayashi, Tadamasa; and Mizushima, Toyoshi, 4,710,266, Cl. 159-7.000.

Ebata, Makoto: *See—*
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Ebato, Seigo: *See—*
Iguchi, Keisuke; and Ebato, Seigo, 4,710,455, Cl. 430-567.000.

Eckert, Bruce M. Tractor dual wheel remover. 4,709,474, Cl. 29-802.000.

Edlund, Roy; and Hom, Jorgen, to Busak & Luyken GmbH and Co. Double wiper seal arrangement. 4,709,932, Cl. 277-165.000.

Egawa, Akira: *See—*
Namai, Akihiro; Egawa, Akira; and Kodaira, Takanori, 4,710,010, Cl. 354-400.000.

Egberg, David C.: *See—*
Seaborne, Jonathan; and Egberg, David C., 4,710,228, Cl. 106-218.000.

Ego, Toyokazu: *See—*
Murakami, Saburo; Kinashi, Shoji; and Ego, Toyokazu, 4,710,333, Cl. 264-73.000.

Eguchi, Kouji: *See—*
Okamoto, Tatsuo; Eguchi, Kouji; and Oosaki, Saburou, 4,710,790, Cl. 357-23.600.

Ehret, Philippe, to Beghin-Say S.A. Absorbing material containing an isothiazoline-one-3 derivative, application to personal hygiene and process for manufacturing this material. 4,710,184, Cl. 604-368.000.

Ehrhardt, Dietmar: *See—*
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, 4,710,814, Cl. 358-143.000.

Eidenberg, Kaspar. Apparatus for the continuous hot tinning of printed circuit boards. 4,709,846, Cl. 228-34.000.

Eiskop, Robert K.: *See—*
Voll, Martin A.; Eiskop, Robert K.; and Yankovsky, Kharri I., 4,709,584, Cl. 73-864.440.

Ejiri, Kazushige, to Alpine Electronics Inc. Safe loading-unloading system for tray in compact disc player. 4,710,910, Cl. 369-75.200.

Ekdahl, Per A. A., to Telefonaktiebolaget LM Ericsson. Sealing device in metal cabinets, which screens off electro-magnetic fields. 4,710,590, Cl. 174-35.0GC.

El Paso Products Company: *See—*
Oetting, Steven L., 4,710,563, Cl. 528-501.000.

Elektro Mekani Arjang AB: *See—*
Faktus, Eskil; and Dahlen, Rolf, 4,710,063, Cl. 405-269.000.

Elger, Gerd. Linear coupling. 4,710,052, Cl. 403-310.000.

Eli Lilly and Company: *See—*
Belagaje, Ramamoorthy; Kuhstoss, Stuart A.; and Rao, R. Nagaraja, 4,710,464, Cl. 435-91.000.
Hershberger, Charles L.; and Larson, Jeffrey L., 4,710,466, Cl. 435-91.000.
Lipson, David; Liu, Benjamin L.; and Loebel, Nicolas G., 4,710,623, Cl. 250-227.000.

Eliscu, Mark: *See—*
Amstutz, Stanford R.; Eliscu, Mark; Lenart, Joseph M.; and Haselton, E. Fletcher, 4,710,916, Cl. 370-58.000.

Elitex koncern textilniho strojirenstvi: *See—*
Curda, Otakar; Maxa, Jaroslav; and Uhlir, Pavel, 4,710,646, Cl. 307-116.000.

Ellion, M. Edmund, to Hughes Aircraft Company. Combined photovoltaic-thermoelectric solar cell and solar cell array. 4,710,588, Cl. 136-206.000.

Ellis, Arthur B.; and van Ryswyk, Hal, to Minnesota Mining and Manufacturing Company. Surface-derivatized semiconductors with chemically sensitive luminescence. 4,710,476, Cl. 436-172.000.

Ellison, Michael J.: *See—*
Goodell, Fred L.; and Ellison, Michael J., 4,709,738, Cl. 152-400.000.

Elmis, Herbert: *See—*
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, 4,710,814, Cl. 358-143.000.

Elopak A/S: *See—*
Andersen, Arve, 4,709,836, Cl. 222-490.000.

Elpatronic AG: *See—*
Kramer, Felix, 4,710,088, Cl. 414-113.000.

Elsby, Leif; and Carlsson, Agneta, to Berol Kemi AB. Process for reducing discoloration and/or tackiness in processing waste paper fibers. 4,710,267, Cl. 162-5.000.

Elscint Ltd.: *See—*
Keren, Hanan; and Freundlich, David, 4,710,716, Cl. 324-309.000.

Elstner, Ingo: *See—*
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, 4,710,480, Cl. 501-95.000.

Elzer, Albert: *See—*
Hoffmann, Gerhard; Hofmann, Reiner; and Elzer, Albert, 4,710,446, Cl. 430-281.000.

Emberger, Roland: *See—*
Bruning, Jurgen; Emberger, Roland; Hopp, Rudolf; and Sand, Theodor, 4,710,392, Cl. 426-534.000.

Emerson Electric Co.: *See—*
Newberg, Barry M., 4,710,037, Cl. 384-537.000.

Emmons, Daniel H., to Nalco Chemical Company. Low molecular weight polyvinyl sulfonate for low pH barium sulfate scale control. 4,710,303, Cl. 210-698.000.

Emori, Yasuyoshi; and Nomura, Ikuo, to Jidosha Kiki Co., Ltd. Rack and pinion steering apparatus. 4,709,591, Cl. 74-422.000.

Empak Inc.: *See—*
Mortensen, Roger; and Gregerson, Barry, 4,709,834, Cl. 220-326.000.

Endo, Michio: *See—*
Harase, Jiro; Ohta, Kuniteru; Takeshita, Tetsurou; and Endo, Michio, 4,709,742, Cl. 164-76.100.

Energy Conversion Devices, Inc.: *See—*
Young, Rosa; and Ovshinsky, Stanford R., 4,710,899, Cl. 365-113.000.

Enertec: *See—*
Sulzer, Jean F., 4,710,828, Cl. 360-75.000.

Engineered Data Products, Inc.: *See—*
Price, Macy J.; Price, Macy J., Jr.; and Johnson, Mack E., 4,709,815, Cl. 206-387.000.

Engineering Patents & Equipment Limited: *See—*
Martin, James W., 4,709,885, Cl. 244-141.000.

Englander, Gary E.: *See—*
Chase, Richard P.; Englander, Gary E.; German, Martin A.; and Volk, Joseph F., 4,709,514, Cl. 51-325.000.

Enichem Elastomeri S.p.A.: *See—*
Carbonaro, Antonio; Gordini, Silvano; and Cucinella, Salvatore, 4,710,553, Cl. 526-142.000.

Enidine Incorporated: *See—*
Houghton, Benjamin T., 4,709,791, Cl. 188-315.000.

Enokizono, Takatoshi, to Kabushiki Kaisha Toshiba. Key input data emulation system. 4,710,869, Cl. 364-200.000.

Entwistle Company, The: *See—*
Krafft, Frederic B., 4,709,542, Cl. 57-16.000.

Environmental Diagnostics, Inc.: *See—*
Lattuada, Charles P.; and Gladden, Frank R., Jr., 4,709,819, Cl. 206-524.800.

Environmental Protection Systems: *See—*
Webster, James B., 4,710,751, Cl. 340-522.000.

Environmental Resources, Inc.: *See—*
Simcox, Allan W., 4,709,689, Cl. 126-448.000.

Environmental Tectonics Corporation: *See—*
Wachsmuth, Robert H.; and Brusch, Donald W., 4,710,128, Cl. 434-46.000.

Envirotech Corporation: *See—*
Davis, Steven S., 4,710,293, Cl. 210-225.000.

Eparco: *See—*
Bavaveas, Tristan, 4,709,425, Cl. 4-228.000.

Equivest, Inc.: *See—*
Lang, James J., 4,710,304, Cl. 210-734.000.

Erbs, Daryl G.: *See—*
Voorhis, Roger; Erbs, Daryl G.; Palmer, John M.; and Marris, Derrick A., 4,709,560, Cl. 62-508.000.

Erdman, George R., to Merck & Co., Inc. Filter assembly for dry powder filling machine. 4,709,837, Cl. 222-636.000.

Erdmann, Hermann; and Rahm, Heiko, to Erno Raumfahrttechnik GmbH. Gas generator. 4,710,359, Cl. 422-191.000.

Erickson, David A., to Illinois Tool Works Inc. Wire clip. 4,709,889, Cl. 248-74.500.

Erickson Tool Company: *See—*
Ramunas, Valdas S., 4,710,077, Cl. 409-232.000.

Eriksson, Sven: *See—*
Santen, Sven; Eriksson, Sven; and Bernhard, Ragnar, 4,710,269, Cl. 162-30.100.

Erix Tool AB: *See—*
Alsen, Per; and Salo, Timo, 4,710,070, Cl. 408-93.000.

Erlam, David P., to Rittal-Werk Rudolf Loh GmbH & Co KG. Fan mounting. 4,710,096, Cl. 415-121.00G.

Erno Raumfahrttechnik GmbH: *See—*
Erdmann, Hermann; and Rahm, Heiko, 4,710,359, Cl. 422-191.000.

Essex Environmental Industries, Inc.: *See—*
Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., 4,709,833, Cl. 220-319.000.

Essinger, James F., Jr., to Wacker Silicones Corporation. Heat curable organopolysiloxane compositions. 4,710,559, Cl. 528-15.000.

Et.Lemer & Cie.: *See—*
Helary, Louis J.; and Grenon, Pierre, 4,710,342, Cl. 376-272.000.

Ethyl Corporation: *See—*
Kirsch, Warren B., 4,710,306, Cl. 252-8.551.
Okamoto, Ted T., 4,710,273, Cl. 203-29.000.
Pettigrew, F. Alexander, 4,710,549, Cl. 525-538.000.
Stahly, G. Patrick; and Stahly, Barbara C., 4,710,581, Cl. 560-20.000.

Etienne, Jacques: *See—*
Broquere, Bernard; and Etienne, Jacques, 4,709,457, Cl. 29-156.80R.

Eto, Shinichi: *See—*
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Euroceltique S.A.: *See—*
Hofer, Peter, 4,710,503, Cl. 514-263.000.

Evans, James: *See—*
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,710,490, Cl. 514-25.000.

Evans, Sean A.; Terpinski, Eva A.; and Testa, Douglas, to Interferon Sciences, Inc. Topical therapeutic composition containing oxidation inhibitor system. 4,710,376, Cl. 424-83.000.

Ewbank, Michael E.; and Johnson, Henry F., to Sundstrand Corporation. High temperature vibration isolating mount. 4,709,665, Cl. 122-510.000.

Excclermatic Inc.: *See—*
Kraus, Charles E., 4,709,589, Cl. 74-206.000.

Exxon Chemical Patents Inc.: *See—*
McAlpin, James J.; and Chow, Wai Y., 4,710,540, Cl. 525-101.000.

Exxon Research and Engineering Company: *See—*
Bock, Jan; Pace, Salvatore J.; and Schulz, Donald N., 4,709,759, Cl. 166-275.000.
Peiffer, Dennis G.; and Lundberg, Robert D., 4,710,555, Cl. 526-240.000.

Eye Research Institute of Retina Foundation: *See—*
Pomerantzeff, Oleg, 4,710,002, Cl. 351-205.000.

Faber, Guy; and Kuhnen, Gottfried, to BBC Brown, Boveri & Company, Limited. Method for fastening blades on the periphery of the rotor body of a steam turbine and the turbo-machine produced by the method. 4,710,103, Cl. 416-219.00R.

Fabian, Frank-Dietrich: *See—*
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.

Fabriques De Tabac Reunies S.A.: *See—*
Gaisch, Helmut; and Nyffeler, Urs, 4,709,710, Cl. 131-308.000.

Fagard, Pierre: *See—*
Dubois, Marcel; and Fagard, Pierre, 4,710,766, Cl. 340-784.000.

Fairchild Semiconductor Corporation: *See—*
Holland, Alex, 4,710,747, Cl. 340-347.0AD.

Faktus, Eskil; and Dahlen, Rolf, to Elektro Mekani Arjang AB. Non-return valve for bore hole sleeves. 4,710,063, Cl. 405-269.000.

Fanuc Ltd.: *See—*
Matsuura, Hitoshi; and Sakurai, Hiroshi, 4,709,482, Cl. 33-1.00M.
Obara, Haruki, 4,710,603, Cl. 219-69.00C.
Otake, Hiromasa, 4,710,119, Cl. 425-136.000.

Faulseit, Bruce K.: *See—*
Reichert, William W.; Cody, Charles A.; Desesa, Michael A.; and Faulseit, Bruce K., 4,710,404, Cl. 427-386.000.

Fearing, Craig; and Orsburn, Michael L., to Utah Scientific Advanced Development Center, Inc. Apparatus for allowing operator selection of a color region of a video image for receiving color corrections. 4,710,800, Cl. 358-22.000.

Feauto, Leo; and Gill, Harold. Smoke house tree. 4,709,446, Cl. 17-1.00R.

Fedotov, Vasilij: *See—*
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.

Fegan, Richard M.: *See—*
Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., 4,709,436, Cl. 15-79.00R.

Feierberg, Susan E.: *See—*
Lee, Duk-Hi; Feierberg, Susan E.; and Mayer, Patricia, 4,710,319, Cl. 252-646.000.

Feik, John W.: *See—*
Bordovsky, Michael J.; and Feik, John W., 4,709,712, Cl. 132-7.000.

Feil, Cornelia: *See—*
Kraemer, Dieter; Siol, Werner; Markert, Gerhard; Suetterlin, Norbert; and Feil, Cornelia, 4,710,525, Cl. 523-201.000.

Feldman, Albert: *See—*
Blackburn, Douglas; Feldman, Albert; and Lagakos, Nicholas, 4,709,987, Cl. 350-96.340.

Feldman, Joel A.; and Hofstetter, Edward M., to Massachusetts Institute of Technology. Voice encoder and synthesizer. 4,710,959, Cl. 381-36.000.

Fendley, James R.: *See—*
Dougherty, Lawrence W.; and Fendley, James R., 4,710,670, Cl. 313-407.000.

Ferag AG: *See—*
Honegger, Werner, 4,709,910, Cl. 270-55.000.

Ferencik, James J.: *See—*
Quante, Jeffrey B., III; Scoggin, Steven C.; Maxwell, Dennis L.; Rosenkoetter, Marvin W.; and Ferencik, James J., 4,709,659, Cl. 109-21.500.

Ferguson, Arthur R., to Outboard Marine Corporation. Marine propulsion device power steering system. 4,710,141, Cl. 440-61.000.

Ferranti Subsea Systems, Inc.: *See—*
Fitzgibbons, Michael R., 4,709,726, Cl. 137-614.040.

Ferraro, Frank A., to Warner-Lambert Company. Blade assembly featuring variable span. 4,709,477, Cl. 30-50.000.

Ferris, Ernest A., to Borg-Warner Corporation. Hydraulically-actuated starting clutch assembly with balanced piston actuation. 4,709,795, Cl. 192-106.00F.

Fersht, Rena S.: *See—*
Fersht, Samuel N.; and Fersht, Rena S., 4,710,027, Cl. 356-350.000.

Fersht, Samuel N.; and Fersht, Rena S., to Litton Systems, Inc. Method and apparatus for mechanical dither stabilization of a laser angular sensor. 4,710,027, Cl. 356-350.000.

FEV Motorentechnik GmbH & Co. KG: *See—*
Lepperhoff, Gerhard, 4,709,549, Cl. 60-295.000.
Pischinger, Franz; Lepperhoff, Gerhard; and Huthwohl, Georg, 4,709,547, Cl. 60-274.000.

Field, Bruce E.: *See—*
Basham, Michael T.; Berdahl, Robert M.; and Field, Bruce E., 4,709,771, Cl. 180-6.500.

Field, John R., to Plessey Overseas Limited. Electrical firing systems. 4,709,615, Cl. 89-1.560.

Fierkens, Richardus H. J.; and Pas, Ireneus J. T. M., to ASM Fico Tooling, b.v. Automatic continuously cycleable molding system and method. 4,710,094, Cl. 414-752.000.

Filippi, Renato: *See—*
Turchi, Sergio; and Filippi, Renato, 4,709,680, Cl. 123-467.000.

Fima, Henri; and Janiaud, Denis, to Crouzet; and Office National d'Etudes et de Recherche Aerospatiales (O.N.E.R.A.). Vibrating string resonator. 4,710,668, Cl. 310-323.000.

Finegold, Hyman B.: *See—*
Beakes, John M.; and Finegold, Hyman B., 4,710,085, Cl. 414-27.000.

Finnan, Jeffrey L.; Lisa, Rudolph E.; and Schmidt, Douglass N., to BASF Corporation. Process for preparing spray dried acetaminophen powder and the powder prepared thereby. 4,710,519, Cl. 514-629.000.

Fiornascente, Nicola. Friction drive for automotive and truck accessories. 4,709,587, Cl. 74-15.630.

Firmin, Dan: *See—*
Crist, Wilmer W.; and Firmin, Dan, 4,709,760, Cl. 166-285.000.

First Brands Corporation: *See—*
Borchardt, Michael G.; Dorsey, Robert T.; and Kamp, Ewald A., 4,710,968, Cl. 383-63.000.

Fischer, Danial O.: *See—*
Heyn, Lynn E.; Johnson, Malcolm L.; and Fischer, Danial O., 4,709,419, Cl. 2-46.000.

Fisher, Theodore F.: *See—*
Hanson, Thomas C.; Fisher, Theodore F.; and Weber, Joseph A., 4,710,212, Cl. 62-23.000.

Fisons plc: *See—*
Wong, Jeffrey T., 4,710,488, Cl. 514-6.000.

FitzGerald, Tanya E.: *See—*
Cates, Barbara J.; and FitzGerald, Tanya E., 4,710,200, Cl. 8-574.000.

Fitzgibbon, James, to Zenith Electronics Corporation. Interactive CRT with touch level set. 4,710,759, Cl. 340-712.000.

Fitzgibbons, Michael R., to Ferranti Subsea Systems, Inc. Hydraulic coupler with floating metal seal. 4,709,726, Cl. 137-614.040.

FitzPatrick, John R.; Dunn, Jerry G.; and Avens, Larry R., to United States of America, Energy. Method for removal of plutonium impurity from americium oxides and fluorides. 4,710,222, Cl. 75-84.10R.

Flakt AB: *See—*
Ziemer, Wolf; Neubert, Fritz; and Holle, Wilhelm, 4,710,208, Cl. 55-355.000.

Fleetwood, Michael J.: *See—*
Law, Anthony G.; and Fleetwood, Michael J., 4,709,743, Cl. 164-463.000.

Fling, Russell T., to RCA Corporation. Phase calculation circuitry in digital television receiver. 4,710,892, Cl. 364-729.000.

Flora, John H.; Womack, Robert E.; Stinnett, Carlton E.; and Dalton, Claude W., to Babcock & Wilcox Company, The. Scanning apparatus and method for inspection of header tube holes. 4,710,710, Cl. 324-220.000.

Fluck, Sydney, Jr.; and Milholland, Marvin L., to Wavetek Corporation. CATV testing system. 4,710,969, Cl. 455-67.000.

FMC Corporation: *See—*
Green, Joseph, 4,710,530, Cl. 524-142.000.

Fogarty, Thomas J.: *See—*
Johnston, James H.; Hermann, George D.; and Atagi, Tanya A., 4,709,698, Cl. 128-303.120.

Foldhazy, Zoltan: *See—*
Klintenstedt, Kjell; Foldhazy, Zoltan; and Forsberg, Bjorn, 4,710,160, Cl. 494-64.000.

Forch, Hans, to Carl Freudenberg, Firma. Shaft and sealing ring. 4,709,930, Cl. 277-68.000.

Ford Aerospace & Communications Corporation: *See—*
Crill, Philip D.; and Rubin, Michael D., 4,710,733, Cl. 332-26.000.

Ford Motor Company: *See—*
Burke, Michael J.; Pidsosny, Richard A.; and Lehner, Gerald J., 4,710,888, Cl. 364-561.000.

Forestier, Serge: *See—*
Lang, Gerard; Forestier, Serge; and LaGrange, Alain, 4,710,584, Cl. 560-51.000.

Forgione, Peter S.; and Singh, Balwant, to American Cyanamid Company. Alkylcarbamylmethylated amino-triazine crosslinking agents and curable compositions containing the same. 4,710,542, Cl. 525-127.000.

Formenti, Giuseppe: *See—*
Ruscelli, Emilio; Carrera, Cesare; and Formenti, Giuseppe, 4,709,739, Cl. 152-453.000.

Forsberg, Bjorn: *See—*
Klintenstedt, Kjell; Foldhazy, Zoltan; and Forsberg, Bjorn, 4,710,160, Cl. 494-64.000.

Fort Wayne Metals Research Products Corporation: *See—*
Michael, Mark S.; and Glaze, Scott A., 4,709,699, Cl. 128-317.000.

Forth, Leslie: *See—*
Duley, Raymond S.; and Forth, Leslie, 4,710,943, Cl. 375-7.000.

Foster, Clark B.: *See—*
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 4,710,170, Cl. 604-110.000.
Haber, Terry M.; Foster, Clark B.; and Lewis, John A., Jr., 4,710,179, Cl. 604-211.000.

Foster-Miller, Inc.: *See—*
Harvey, Andrew C.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,709,453, Cl. 24-442.000.

Foster, Raymond K. Drive/frame assembly for reciprocating floor conveyor. 4,709,805, Cl. 198-750.000.

Fottinger, Walter; and Jorder, Kurt, to Carl Freudenberg, Firma. Insole. 4,709,490, Cl. 36-44.000.

Foundation: The Research Institute of Electric and Magnetic Alloys, The: *See—*
Masumoto, Hakaru; and Murakami, Yuetsu, 4,710,243, Cl. 148-312.000.

France, Randall W.: *See—*
Doyle, Francis S.; and France, Randall W., 4,710,954, Cl. 379-427.000.

Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, to Bayer Aktiengesellschaft. Circulation active pyrimidinyl-dihydropyridines. 4,710,501, Cl. 514-256.000.

Franke, David W.; and Hall, Carroll R., to Texas Instruments Incorporated. Method for generating and displaying tree structures in a limited display area. 4,710,763, Cl. 340-723.000.

Franke, Gunter; Ockelmann, Dieter; Raue, Roderich; and Wild, Peter, to Bayer Aktiengesellschaft. Basic dyestuffs. 4,710,569, Cl. 544-31.000.

Frankl & Kirchner GmbH & Co KG: *See—*
Lengsfeld, Karl; Link, Erich; Martin, Adolf; and Wittler, Hilmar, 4,709,794, Cl. 192-18.00B.

Franz Haas Waffelmaschinen Industriegesellschaft m.b.H.: *See—*
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,710,117, Cl. 425-126.00R.

Franz, Hans-Joachim: *See—*
Sadler, Karl-Otto; Schmidt, Willy; and Franz, Hans-Joachim, 4,709,646, Cl. 114-5.000.

Frappier, Edward P.: *See—*
Hull, Ezekiel H.; and Frappier, Edward P., 4,710,532, Cl. 524-310.000.

Fraser, James: *See—*
Davies, Roy V.; and Fraser, James, 4,710,506, Cl. 514-301.000.

Fraumhofer-Gesellschaft zur Forderung der angewandten Forschung e.v.: *See—*
Illig, Egon; and Kniep, Volkmar, 4,709,912, Cl. 271-42.000.

Frawley, Lanny J., to Cooper Industries, Inc. Pliers crimpable terminal. 4,710,140, Cl. 439-733.000.

Freberg, Dana D.; and Spencer, William R., to General Electric Company. Turbomachine airflow temperature sensor. 4,710,095, Cl. 415-48.000.

Fredenucci, Pierre, to Arjomari-Prioux. Process for the treatment of a fibrous sheet obtained by papermaking process, with a view to improving its dimensional stability, and application of said process to the field of floor and wall-coverings. 4,710,422, Cl. 428-248.000.

Freeman, Maurice E.: *See—*
Northrup, Walter E.; and Freeman, Maurice E., 4,710,414, Cl. 428-43.000.

Freeman, William R., Jr., to Howmet Turbine Components Corporation. Method of forming dense ingots having a fine equiaxed grain structure. 4,709,461, Cl. 29-526.300.

Freeport Minerals Company: *See—*
Astley, Vivian C.; and Taravella, Jody J., 4,710,366, Cl. 423-321.00R.

Freitag, Herbert; Fuhrmann, Castor; and Hosan, Hans-Josef, to Stabilus GmbH. Continuously adjustable length adjustment device. 4,709,790, Cl. 188-300.000.

Freundlich, David: *See—*
Keren, Hanan; and Freundlich, David, 4,710,716, Cl. 324-309.000.

Frey, Timothy J.: *See—*
Meyers, Peter V.; Liu, Chung-Heng; and Frey, Timothy J., 4,710,589, Cl. 136-258.0PC.

Friedman, Lee G.; Hailpern, Brent T.; Hoevel, Lee W.; and Thefaine, Yannick J., to International Business Machines Corporation. Transmit-secure non-blocking circuit-switched local area network. 4,710,769, Cl. 340-825.030.

Frisbie, Milo W.: *See—*
Swapp, Mavin C.; and Frisbie, Milo W., 4,709,801, Cl. 198-464.200.

Frohn, Gustav K.: *See—*
Mierbach, Hans-Bernd; Frohn, Gustav K.; and Blockisch, Olaf, 4,709,600, Cl. 81-57.390.

Frommann, Klaus, to Mannesmann AG. Annealing steel strip. 4,710,240, Cl. 148-156.000.

Frost, Robert T.: *See—*
Lowry, Hugh R.; and Frost, Robert T., 4,709,749, Cl. 164-503.000.

Fruhbuss, Heinrich. Process of removing SO_x and NO_x from waste gases. 4,710,363, Cl. 423-239.000.

Fry Metals, Inc.: *See—*
Socolowski, Norbert J., 4,709,849, Cl. 228-246.000.

Fryberger, Joseph A.: *See*—
Smith, David E.; Olmsted, Dennis R.; and Fryberger, Joseph A., 4,709,873, Cl. 242-195.000.
Fuchs, Axel: *See*—
Lepand, Heinz; Huser, Margrit; Biniasz, Franz-Josef; and Fuchs, Axel, 4,710,244, Cl. 148-333.000.
Fugier, Roger; de Goys de Mezerac, Charles; Joachim, Jacky; and Decagny, Michel, to Isover Saint-Gobain. Resin for a sizing composition, a process for its preparation and the sizing composition obtained. 4,710,406, Cl. 427-389.800.
Fugitt, Cullen Wayne: *See*—
Andrews, John R., 4,709,648, Cl. 114-363.000.
Fuhrmann, Castor: *See*—
Freitag, Herbert; Fuhrmann, Castor; and Hosan, Hans-Josef, 4,709,790, Cl. 188-300.000.
Fuji Electric Company, Ltd.: *See*—
Kawabata, Osamu, 4,710,705, Cl. 324-102.000.
Nakamura, Junji; Nishimura, Ikuma; Saito, Goro; and Matsumoto, Kozo, 4,710,436, Cl. 429-41.000.
Ueno, Masakazu, 4,709,992, Cl. 350-339.00R.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Sakai, Yasuhito, 4,710,151, Cl. 474-28.000.
Fuji Photo Film Co., Ltd.: *See*—
Aotsuka, Yasuo; Konishi, Masahiro; and Takahashi, Koji, 4,710,631, Cl. 250-354.100.
Inatsuki, Kenichi, 4,710,818, Cl. 358-214.000.
Itoh, Haruo, 4,710,832, Cl. 360-10.200.
Matsumoto, Takashi, 4,710,837, Cl. 360-110.000.
Naito, Hideki, 4,710,450, Cl. 430-351.000.
Nakajima, Nobuyoshi; and Hishinuma, Kazuhiro, 4,710,875, Cl. 364-414.000.
Naoi, Takashi; Fujioka, Takashi; Okamura, Hisashi; and Satake, Masaki, 4,710,456, Cl. 430-564.000.
Ono, Toshio; Tamai, Yasuo; Mizuno, Chiaki; Ogawa, Hiroshi; and Saito, Shinji, 4,710,421, Cl. 428-213.000.
Suzuki, Kenji; Terashita, Takaaki; and Murayama, Jin, 4,710,803, Cl. 358-41.000.
Takahashi, Kenji; Umemoto, Chiyuki; and Kato, Hisatoyo, 4,710,626, Cl. 250-327.200.
Terashita, Takaaki, 4,710,019, Cl. 355-38.000.
Ushiro, Seimei, 4,710,011, Cl. 354-403.000.
Fuji Photo Optical Co., Ltd.: *See*—
Harada, Yuho; Maruyama, Tsutomu; Kumakura, Yoshiyuki; and Kuwayama, Shigeo, 4,710,216, Cl. 65-4.100.
Fuji Xerox Co., Ltd.: *See*—
Miyao, Fumio, 4,710,918, Cl. 370-85.000.
Saito, Koichi; Fujimura, Yoshihiko; and Inoue, Nanao, 4,710,780, Cl. 346-1.100.
Fujihara, Masaaki; Fujii, Ikunori; and Fujita, Shuji, to Tokyo Juki Industrial Co., Ltd. Sewing machine presser foot lifting apparatus. 4,709,644, Cl. 112-237.000.
Fujii, Ikunori: *See*—
Fujihara, Masaaki; Fujii, Ikunori; and Fujita, Shuji, 4,709,644, Cl. 112-237.000.
Fujii, Yoshihiko: *See*—
Osaki, Shigeyoshi; and Fujii, Yoshihiko, 4,710,700, Cl. 324-58.50A.
Fujimura, Yoshihiko: *See*—
Saito, Koichi; Fujimura, Yoshihiko; and Inoue, Nanao, 4,710,780, Cl. 346-1.100.
Fujinawa, Tomoaki: *See*—
Nohara, Fujio; and Fujinawa, Tomoaki, 4,710,498, Cl. 514-242.000.
Fujioka, Takashi: *See*—
Naoi, Takashi; Fujioka, Takashi; Okamura, Hisashi; and Satake, Masaki, 4,710,456, Cl. 430-564.000.
Fujishima, Kazuyasu: *See*—
Kumanoya, Masaki; Fujishima, Kazuyasu; and Dosaka, Katsumi, 4,710,901, Cl. 365-190.000.
Fujita, Minoru, to Yamaha Hatsudoki Kabushiki Kaisha. Governor for small size vehicle. 4,709,675, Cl. 123-376.000.
Fujita, Shigeto: *See*—
Oomori, Tatsuo; Ono, Kouichi; and Fujita, Shigeto, 4,710,937, Cl. 372-53.000.
Fujita, Shuji: *See*—
Fujihara, Masaaki; Fujii, Ikunori; and Fujita, Shuji, 4,709,644, Cl. 112-237.000.
Fujitsu Limited: *See*—
Kitahara, Takeshi, 4,710,915, Cl. 370-16.000.
Kojima, Haruo; and Akasaki, Hidehiko, 4,710,250, Cl. 156-89.000.
Maegawa, Harumi; Takai, Sakan; Sukeda, Toshiaki; Irie, Shoji; and Kobata, Shoichi, 4,710,895, Cl. 365-2.000.
Okubo, Kimio; and Nemoto, Hiroshi, 4,709,512, Cl. 51-237.00R.
Shimoda, Kaneyasu; Katoh, Tadayoshi; and Ageno, Yuzo, 4,710,746, Cl. 340-347.0DD.
Shirato, Takehide; and Sekine, Shinichi, 4,710,791, Cl. 357-23.130.
Soeda, Kazuhiko; Mori, Masakazu; Nishikawa, Tsutomu; and Tomimori, Kiyoshi, 4,710,022, Cl. 356-73.100.
Suzuki, Atsushi, 4,710,904, Cl. 365-226.000.
Suzuki, Hideo, 4,710,651, Cl. 307-462.000.
Yamagishi, Wataru; and Sagawa, Masato, 4,710,242, Cl. 148-301.000.
Fujiura, Yoji: *See*—
Noda, Kimihiko; Fujiura, Yoji; and Hasegawa, Yoichi, 4,710,298, Cl. 210-505.000.
Fujiwara, Kouzou: *See*—
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.
Fujiyama, Yasutomo, to Canon Kabushiki Kaisha. Layer forming apparatus. 4,709,656, Cl. 118-723.000.
Fuke, Akira; Tokita, Yasuhiro; and Masuda, Katsuhiko, to Koito Seisakusho Co., Ltd. Metal ion laser protected against the deposition of metal vapor on brewster windows. 4,710,938, Cl. 372-56.000.
Fukuma, Toshiaki, to Shimadzu Corporation. Spectrophotometer. 4,710,024, Cl. 356-328.000.
Fukumitsu, Shohji: *See*—
Tabata, Nobuchika; and Fukumitsu, Shohji, 4,710,317, Cl. 252-609.000.
Fukumoto, Hiroshi: *See*—
Tanaka, Katsuhiko; and Fukumoto, Hiroshi, 4,710,443, Cl. 430-106.600.
Fukumura, Kagenori: *See*—
Yasue, Hideki; and Fukumura, Kagenori, 4,709,597, Cl. 74-868.000.
Fukuyama, Kazuo: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.
Fulger, Charles V.; and Gum, Ernest K., to General Foods Corporation. All natural, ready-to-eat enzyme-saccharified cereal derived from whole cereal grain. 4,710,386, Cl. 426-28.000.
Funahashi, Masaya: *See*—
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, 4,709,816, Cl. 206-444.000.
Funaki, Shinsuke; Akanabe, Yuichi; and Ikeda, Hiroaki, to Konishiroku Photo Industry Co., Ltd. Optical recording apparatus. 4,710,779, Cl. 346-1.100.
Funakubo, Hiroyasu: *See*—
Sekiguchi, Yukio; Funakubo, Hiroyasu; Sakanoue, Hitoyuki; and Komura, Osamu, 4,709,844, Cl. 228-3.100.
Fuqua, Clark R., to Genus Catheter Technologies, Inc. Variable diameter catheter. 4,710,181, Cl. 604-280.000.
Furia, Edoardo: *See*—
Camiciotti, Leonardo; and Furia, Edoardo, 4,709,563, Cl. 66-222.000.
Furukawa, Kaoru: *See*—
Yamada, Satoshi; and Furukawa, Kaoru, 4,710,695, Cl. 320-21.000.
Furukawa, Toshio: *See*—
Akao, Takeshi; and Furukawa, Toshio, 4,709,487, Cl. 34-10.000.
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device. 4,710,789, Cl. 357-23.600.
Furuya, Akira: *See*—
Katsumata, Ryoichi; Ozaki, Akio; Oka, Tetsuo; and Furuya, Akira, 4,710,471, Cl. 435-253.000.
Fusion Systems Corporation: *See*—
Wood, Charles H., 4,710,638, Cl. 250-492.100.
Future Fire Suppression, Inc.: *See*—
Jessick, James, 4,709,763, Cl. 169-26.000.
G. D. Societa Per Azioni: *See*—
Mattei, Riccardo; and Minarelli, Alessandro, 4,710,257, Cl. 156-578.000.
Gaisch, Helmut; and Nyffeler, Urs, to Fabriques De Tabac Reunies S.A. Process for improving tobacco. 4,709,710, Cl. 131-308.000.
Galbraith, Andrew D., to Lockheed Missiles & Space Company, Inc. Electric propulsion system for aircraft. 4,709,882, Cl. 244-53.00R.
Galley, Richard A.: *See*—
Bryant, David R.; and Galley, Richard A., 4,710,587, Cl. 568-454.000.
Gambro Dialysatoren KG: *See*—
Bryant, David R.; and Galley, Richard A., 4,710,587, Cl. 568-454.000.
Gambro Lundia AB: *See*—
Bryant, David R.; and Galley, Richard A., 4,710,587, Cl. 568-454.000.
Gamburg, David: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.
Ganser, Marco: *See*—
Djordjevic, Ilija; and Ganser, Marco, 4,709,679, Cl. 123-447.000.
Ganz, Rudolf: *See*—
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, 4,710,480, Cl. 501-95.000.
Garcia, Steven A. Soap holder cover. 4,709,428, Cl. 4-605.000.
Gardini, Gian P.; and Bocchi, Vittorio, to Universita' Degli Studi Di Parma. Chemical process for conferring conductor, antistatic and flame-proofing properties to porous materials. 4,710,400, Cl. 427-121.000.
Garlick, George F. J., to Spectrolab, Inc. Process for fabricating a solar energy converter employing a fluorescent wavelength shifter. 4,710,254, Cl. 156-278.000.
Garner, John N., to Northern Telecom Limited. Apparatus for insulating an electrical conductor. 4,710,114, Cl. 425-110.000.
Garnier, Gilbert: *See*—
Neel, Jean-Philippe; Case, Roger; and Garnier, Gilbert, 4,710,738, Cl. 335-172.000.

Garson, Eugene: *See—*
Mahaffy, Reid A.; Garson, Eugene; and Ostrow, Milan R., 4,709,535, Cl. 53-473.000.
Garst, Gregory C. Lures with dissimilar tail lengths. 4,709,501, Cl. 43-42.240.
Gas Energy, Inc.: *See—*
Russo, Onofrio N., 4,709,720, Cl. 137-385.000.
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, to Deutsche ITT Industries GmbH. Television sound receiving circuit for at least one sound channel contained in an RF signal. 4,710,814, Cl. 358-143.000.
Gatlin, C. Elmon. Tactile training device for a tennis racket handle. 4,709,925, Cl. 273-29.00A.
Gawron, Klaus: *See—*
Schroder, Johann; Gawron, Klaus; Bertram, Leo; and Schemmann, Hugo, 4,709,752, Cl. 165-47.000.
Gaz de France: *See—*
Genest, Bernard, 4,710,312, Cl. 252-68.000.
Gazzi, Luigi; and Rescalli, Carlo, to Snamprogetti, S.p.A. Cryogenic process for the removal of acidic gases from mixtures of gases by using solvents. 4,710,210, Cl. 62-17.000.
Gazzi, Luigi; and Rescalli, Carlo, to Snamprogetti S.p.A. Cryogenic process for the selective removal of acidic gases from mixtures of gases by solvents. 4,710,211, Cl. 62-17.000.
Geais, Robert. Railway system utilizing a linear motor for propulsion of trains. 4,709,639, Cl. 104-292.000.
Gebauer, Helmut: *See—*
Hafner, Walter; Ritter, Peter; Gebauer, Helmut; and Regiert, Marlies, 4,710,316, Cl. 512-20.000.
Gebhard, Georg R. U.; Hein, Klaus R. G.; and Glaser, Wolfgang, to Rheinisch-Westfalisches Elektrizitatswerk Aktiengesellschaft. Process for the dry removal of sulfur dioxide from flue gas. 4,710,365, Cl. 423-244.000.
Gebr. Marklin & Cie. GmbH: *See—*
Rother, Helmut; and Reyher, Manfred, 4,709,856, Cl. 238-10.00E.
Geczy, Bela, to Smith International, Inc. Bearing assembly. 4,710,036, Cl. 384-275.000.
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, to BASF Aktiengesellschaft. Pyrrol-1-ylphenyldihydropyridazinones, their preparation and their use. 4,710,496, Cl. 514-183.000.
General DataComm, Inc.: *See—*
Manning, David J., 4,710,920, Cl. 370-100.000.
General Dynamics Corporation: *See—*
Bradfield, Ganey W.; and Cragin, Glynn P., Jr., 4,709,880, Cl. 244-12.500.
General Dynamics, Pomona Division: *See—*
Piesik, Edward T., 4,709,780, Cl. 181-213.000.
General Electric Company: *See—*
Balke, Roy L.; Merrifield, Charles H.; and Mizikowski, Frank E., 4,710,662, Cl. 310-204.000.
Breen, Thomas B., 4,710,843, Cl. 361-96.000.
Cline, Harvey E.; and Lorensen, William E., 4,710,876, Cl. 364-414.000.
Cox, Frederick E.; Rink, Frederick J., Jr.; and Valachovic, Richard A., 4,710,664, Cl. 310-217.000.
Freberg, Dana D.; and Spencer, William R., 4,710,095, Cl. 415-48.000.
Huang, Shyh-Chin; Chang, Keh-Minn; and Taub, Alan I., 4,710,247, Cl. 148-429.000.
Kurokawa, Haruo, 4,710,596, Cl. 379-424.000.
Liu, Ping Y., 4,710,534, Cl. 524-411.000.
Lowry, Hugh R.; and Frost, Robert T., 4,709,749, Cl. 164-503.000.
Pelc, Norbert J.; and Glover, Gary H., 4,710,717, Cl. 324-309.000.
Scott, Graham A.; and Messerli, Alan J., 4,710,844, Cl. 361-96.000.
White, Charles M.; and Green, Wayne T., 4,710,725, Cl. 330-51.000.
General Electric Company plc, The: *See—*
Law, Anthony G.; and Fleetwood, Michael J., 4,709,743, Cl. 164-463.000.
General Foods Corporation: *See—*
Fulger, Charles V.; and Gum, Ernest K., 4,710,386, Cl. 426-28.000.
Vietrogoski, Charles J.; Obarowski, Richard; and McDonough, Paul J., 4,709,608, Cl. 83-355.000.
General Instrument Corporation: *See—*
Kauffman, Marc W., 4,710,955, Cl. 380-10.000.
General Kinematics Corporation: *See—*
Musschoot, Albert, 4,709,507, Cl. 51-7.000.
General Mills, Inc.: *See—*
Seaborne, Jonathan; and Egberg, David C., 4,710,228, Cl. 106-218.000.
General Motors Corporation: *See—*
Baity, Donald N.; Schwandt, Gregory J.; and Kidwell, Charles E., 4,710,602, Cl. 200-315.000.
Keen, Nickey D., 4,710,852, Cl. 361-386.000.
Lee, Robert W.; and Schaffel, Neal A., 4,710,239, Cl. 148-101.000.
Lehnhoff, Richard N.; and Disser, Robert J., 4,710,685, Cl. 318-287.000.
Vahabzadeh, Hamid, 4,710,879, Cl. 364-424.100.
General Signal Corporation: *See—*
Latka, Henry C., 4,710,258, Cl. 156-601.000.
Genest, Bernard, to Gaz de France. Stable mixtures of chlorofluorohydrocarbons and solvents and their use as heat transfer compositions for absorption heat pumps. 4,710,312, Cl. 252-68.000.
Genicom Corporation: *See—*
Lim, Sam K., 4,710,045, Cl. 400-352.000.
Gentry, Cecil C.; and Small, William M., to Phillips Petroleum Company. Heat exchanger. 4,709,755, Cl. 165-160.000.
Genus Catheter Technologies, Inc.: *See—*
Fuqua, Clark R., 4,710,181, Cl. 604-280.000.
George, Raymond A.: *See—*
Dollard, Walter J.; Doshi, Pratap K.; and George, Raymond A., 4,710,340, Cl. 376-209.000.
George, Robert W., II: *See—*
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., 4,710,020, Cl. 356-1.000.
Gerace, Michael J.; Krysiak, Gary D.; and Schiappacasse, Russell F., to Protective Treatments, Inc. Compatible bedding compound for organically sealed insulating glass. 4,710,411, Cl. 428-34.000.
Gerber, Pierre: *See—*
Winkelmann, Manfred; Muschner, Udo; and Gerber, Pierre, 4,709,905, Cl. 266-270.000.
Gerich, Josef: *See—*
Schulze, Werner; and Gerich, Josef, 4,709,859, Cl. 239-525.000.
German, Martin A.: *See—*
Chase, Richard P.; Englander, Gary E.; German, Martin A.; and Volk, Joseph F., 4,709,514, Cl. 51-325.000.
Gettinger, Lillian, to Andre Fantasies, Inc. Shampoo cape with splash guard. 4,709,420, Cl. 2-50.000.
Geuens, Luc, to S.A. Innovi N.V. Wastewater purification process. 4,710,301, Cl. 210-605.000.
Gibbons, Frank B., to Gibbons, Maxine S. Sheet pile supported driver. 4,709,764, Cl. 173-45.000.
Gibbons, Maxine S.: *See—*
Gibbons, Frank B., 4,709,764, Cl. 173-45.000.
Giberti-Fornaciari, Serse, to Vidriera Monterrey, S.A. Take-out tong head assembly. 4,710,218, Cl. 65-260.000.
Gibson, Christopher S. Portable exercise machine. 4,709,923, Cl. 272-134.000.
Gietema, Jouke; and Oude Elberink, Bernard H. M., to Hollandse Signaalapparaten B.V. Data converter for a pulse radar apparatus. 4,710,773, Cl. 342-185.000.
Gil, Kim Y.; and Sun, Lee C., to Korea Advanced Institute of Science and Technology. Maraging steel having high strength and high toughness. 4,710,347, Cl. 420-94.000.
Gill, Harold: *See—*
Feauto, Leo; and Gill, Harold, 4,709,446, Cl. 17-1.00R.
Gillette Company, The: *See—*
Shurtleff, Jill M.; and Lee, Alejandro C., 4,709,476, Cl. 30-41.000.
Giovanni, Conterno: *See—*
Giovanni, Todescato; and Giovanni, Conterno, 4,709,510, Cl. 51-177.000.
Giovanni, Todescato; and Giovanni, Conterno. Floor sanding and polishing machine. 4,709,510, Cl. 51-177.000.
Giovinazzo, Vincent J. Posterior chamber intraocular lens. 4,710,195, Cl. 623-6.000.
Girard, Donald J.: *See—*
Belknap, William M.; Chanasyk, Albert J.; O'Dell, Robert R.; and Girard, Donald J., 4,710,871, Cl. 364-200.000.
Gish Biomedical, Inc.: *See—*
Quick, Richard L., 4,710,176, Cl. 604-177.000.
Gish, Larry D., to Johnson Service Company. Integral base refill system ballcock assembly. 4,709,721, Cl. 137-437.000.
Gist-Brocades N.V.: *See—*
Hofman, Petrus S.; Hall, David W. R.; and Jaitly, Kapil D., 4,710,571, Cl. 544-216.000.
Giuliani, Karen A.: *See—*
Giuliani, Robert L.; Giuliani, Mark A.; and Giuliani, Karen A., 4,709,883, Cl. 244-63.000.
Giuliani, Mark A.: *See—*
Giuliani, Robert L.; Giuliani, Mark A.; and Giuliani, Karen A., 4,709,883, Cl. 244-63.000.
Giuliani, Robert L.; Giuliani, Mark A.; and Giuliani, Karen A. Launch and ascent system. 4,709,883, Cl. 244-63.000.
Givler, Omar R., to Portage Electric Products, Inc. Thermostatic device with leak tight casing. 4,710,743, Cl. 337-380.000.
Gjota, Rifat. Winding arrangement of a stator and/or rotor of a three-phase generator or electromotor with improved performances. 4,710,661, Cl. 310-198.000.
Gladden, Frank R., Jr.: *See—*
Lattuada, Charles P.; and Gladden, Frank R., Jr., 4,709,819, Cl. 206-524.800.
Glaenzer Spicer: *See—*
Mangiavacchi, Jacques, 4,710,150, Cl. 464-14.000.
Glaser, Wolfgang: *See—*
Gebhard, Georg R. U.; Hein, Klaus R. G.; and Glaser, Wolfgang, 4,710,365, Cl. 423-244.000.
Glaze, Scott A.: *See—*
Michael, Mark S.; and Glaze, Scott A., 4,709,699, Cl. 128-317.000.
Gleaves, Geoffrey H., to Ropol, Inc. Self-cleaning gutter device. 4,709,516, Cl. 52-11.000.
Gleich, Gerald J.; and Wasmoen, Terri L., to Mayo Medical Resources. Method for the determination of the imminence of labor. 4,710,475, Cl. 436-86.000.
Global Equipment Company: *See—*
Leeds, Richard; and Roberts, Arthur, 4,709,971, Cl. 312-201.000.
Glomb, Kurt; Niggl, Heinz; Pelzl, Leo; and Zell, Karl, to Siemens Aktiengesellschaft. Electrical plug connector strip. 4,710,132, Cl. 439-79.000.
Glover, Gary H.: *See—*
Pelc, Norbert J.; and Glover, Gary H., 4,710,717, Cl. 324-309.000.

Glowacki, Tad. Screw press for dewatering sludge and fiber suspensions. 4,709,628, Cl. 100-148.000.

Gober, Ruel R. Pilot valve. 4,709,727, Cl. 137-625.660.

Gobrecht, Jens: *See—*
Nippert, Georg; Hahn, Berthold; and Gobrecht, Jens, 4,710,795, Cl. 357-65.000.

Godwin, Oliver W., Jr. Means for producing a water splash shield for commodes, urinals or the like. 4,709,426, Cl. 4-300.300.

Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, to Brennstoffinstitut Freiberg. Apparatus for gasifying pulverized coal. 4,710,202, Cl. 48-73.000.

Gold, Samuel: *See—*
Tokumoto, Minoru; Takagi, Motoyuki; Shitaoka, Shizuo; Gold, Samuel; and Iovine, Carmine P., 4,710,526, Cl. 524-5.000.

Goodacre, Brita C.: *See—*
Bateman, John R.; Goodacre, Brita C.; and Smithson, Alan, 4,710,231, Cl. 127-30.000.

Goodell, Fred L.; and Ellison, Michael J., to AM General Corporation. Bead lock for pneumatic tires. 4,709,738, Cl. 152-400.000.

Goodsmith, James E.: *See—*
Smith, D. Frederick; and Goodsmith, James E., 4,710,079, Cl. 409-234.000.

Goodstine, Stephen L.: *See—*
Barto, Ronald J.; Goodstine, Stephen L.; and Noto, Frank A., 4,709,664, Cl. 122-379.000.

Goodyear Tire & Rubber Company, The: *See—*
Candle, Richard D., 4,709,806, Cl. 198-819.000.

Gordini, Silvano: *See—*
Carbonaro, Antonio; Gordini, Silvano; and Cucinella, Salvatore, 4,710,553, Cl. 526-142.000.

Gothard, Patrick G., to Aquarium Pharmaceuticals, Inc. Aquatic viewing system. 4,709,657, Cl. 119-5.000.

Goto, Hideo: *See—*
Kobayashi, Kozo; and Goto, Hideo, 4,710,907, Cl. 369-6.000.

Goto, Masaki: *See—*
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Gottlieb, A. Arthur, to Imreg, Inc. Treatment of autoimmune disorders with immunoamplifiers. 4,710,380, Cl. 424-101.000.

Goulding, Kenneth, to British Aerospace PLC. Deployment and actuation mechanisms. 4,709,877, Cl. 244-3.280.

Grabovac, Bosko; and Kurtovic, Zlatko, to Consolidated Devices, Inc. Hand grip drive for torque wrenches. 4,709,602, Cl. 81-483.000.

Graiver, Daniel; and Kalinowski, Robert E., to Dow Corning Corporation. Adhesion of silicone elastomers obtained from aqueous emulsion. 4,710,405, Cl. 427-387.000.

Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., to Essex Environmental Industries, Inc. Rotationally molded salvage drum and recessed lid. 4,709,833, Cl. 220-319.000.

Granger, Douglas A.: *See—*
Yu, Ho; and Granger, Douglas A., 4,709,747, Cl. 164-487.000.

Gray, Randall C., to Motorola, Inc. Voltage comparator with hysteresis. 4,710,793, Cl. 357-44.000.

Green Cross Corporation, The: *See—*
Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, 4,710,161, Cl. 494-84.000.

Green, Joseph, to FMC Corporation. Flame retardant polyphenylene ether molding compositions. 4,710,530, Cl. 524-142.000.

Green, Stephen H.; Hofstetter, Robert W., Sr; and Hofstetter, Robert W., Jr., to I&H Conveying & Machine Company. Mass product handling ring system. 4,709,802, Cl. 198-465.100.

Green, Wayne T.: *See—*
White, Charles M.; and Green, Wayne T., 4,710,725, Cl. 330-51.000.

Greene, Hugh W.; Holder, James D.; and Knaur, James A. Air cushion-optical data read head. 4,710,912, Cl. 369-218.000.

Gregerson, Barry: *See—*
Mortensen, Roger; and Gregerson, Barry, 4,709,834, Cl. 220-326.000.

Gregory, Vernon C. In-mold process for fabrication of molded plastic printed circuit boards. 4,710,419, Cl. 428-210.000.

Grenier, Gilles; Maffert, Jerome; Merle, Jean-Pierre; and des Ordons, Jacques R., to Aerospatiale Societe Nationale Industrielle. System for locating a body in motion. 4,710,028, Cl. 356-375.000.

Grenon, Pierre: *See—*
Helary, Louis J.; and Grenon, Pierre, 4,710,342, Cl. 376-272.000.

Grey, Michael O., to NCR Corporation. Printer having constant pressure between print head and platen. 4,710,040, Cl. 400-55.000.

Grider, Lyle D. Apparatus for aiding in loading a mobile work platform onto an elevated surface. 4,709,784, Cl. 182-16.000.

Gries, Josef: *See—*
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, 4,710,496, Cl. 514-183.000.

Grilliot, Mary I.: *See—*
Grilliot, William L.; and Grilliot, Mary I., 4,709,421, Cl. 2-81.000.

Grilliot, William L.; and Grilliot, Mary I. Firefighter's coat. 4,709,421, Cl. 2-81.000.

Grinblat, Arkady. Universal exercising apparatus. 4,709,918, Cl. 272-97.000.

Grollier, Jean F.; and Dubief, Claude, to L'Oreal. Cosmetic composition containing cationic polymers and anionic latexes. 4,710,374, Cl. 424-61.000.

Gropper, Hans: *See—*
Bachl, Robert; Warzelhan, Volker; Schweier, Guenther; Gropper, Hans; and Ball, Wolfgang, 4,710,552, Cl. 526-116.000.

Gross, Akiva T.: *See—*
Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., 4,710,583, Cl. 560-40.000.

Gross, Anthony E.; Christie, Richard D.; and Pinder, Thomas E., to Nalco Chemical Company. Vermiculite flotation promoter. 4,710,285, Cl. 209-166.000.

Gross-Given Manufacturing Co.: *See—*
Layre, John; Park, Yong S.; and Schollhamer, George K., 4,709,625, Cl. 99-289.00R.

Gross, Rainer: *See—*
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, 4,710,501, Cl. 514-256.000.

Grosscurt, Arnoldus C.: *See—*
Brouwer, Marius S.; and Grosscurt, Arnoldus C., 4,710,516, Cl. 514-594.000.

Grosswiller, Leo J., Jr.: *See—*
Anders, Walter G.; Grosswiller, Leo J., Jr.; Lozier, Benjamin F.; and Rozlosnik, Alan J., 4,710,098, Cl. 415-149.00A.

Grumman Aerospace Corporation: *See—*
Yee, Seening, 4,710,653, Cl. 307-518.000.

Gryp, Dennis: *See—*
Wahls, Robert; and Gryp, Dennis, 4,709,896, Cl. 248-550.000.

GTE Laboratories Incorporated: *See—*
Amstutz, Stanford R.; Eliscu, Mark; Lenart, Joseph M.; and Haselton, E. Fletcher, 4,710,916, Cl. 370-58.000.
Baldoni, J. Gary, II; Buljan, Sergej-Tomislav; and Sarin, Vinod K., 4,710,425, Cl. 428-328.000.
Budinger, A. Bowman; and Lapatovich, Walter P., 4,710,679, Cl. 315-58.000.
Sigai, A. Gary, 4,710,674, Cl. 313-489.000.

GTE Products Corporation: *See—*
Morris, Merle E.; Rice, Lawrence M.; and Meade, Steven L., 4,710,676, Cl. 313-579.000.
Ritsko, Joseph E.; and Acla, Howard L., 4,710,368, Cl. 423-344.000.

GTE Sprint Communications Corp.: *See—*
Chum, Stanley, 4,710,924, Cl. 371-4.000.

Guare, James P., Jr.: *See—*
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., 4,710,504, Cl. 514-267.000.

Guczoghy, Lajos: *See—*
Vertesi, Csaba; Molnar, Attila; and Guczoghy, Lajos, 4,710,578, Cl. 558-4.000.

Gudymov, Ernest: *See—*
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.

Guguchkova-Yanchuleva, Pravoslava T.: *See—*
Dyakov, Nikola G.; Guguchkova-Yanchuleva, Pravoslava T.; and Benchev, Dimiter V., 4,710,196, Cl. 623-6.000.

Guiffray, Michel. Container shaped in such manner as to be unoverturnable for receiving a liquid. 4,709,821, Cl. 215-1.00R.

Guioth, Chantal H.; Maze, Etienne G.; and Rabajoie, Loick P., to Akzo NV. Process for coating an electrically conductive substrate and an aqueous coating composition based on a cationic binder. 4,710,281, Cl. 204-181.700.

Gullers, Per, to Alfa-Laval Separation AB. Centrifugal separator. 4,710,159, Cl. 494-27.000.

Gum, Ernest K.: *See—*
Fulger, Charles V.; and Gum, Ernest K., 4,710,386, Cl. 426-28.000.

Gunny, Edmond R. Aircraft collision avoidance system. 4,710,774, Cl. 342-455.000.

Gurgui, Merce B. Adjustable support for bookshelves. 4,709,892, Cl. 248-250.000.

Gurney, Robert A. Alarm for milk cooler. 4,710,755, Cl. 340-585.000.

Gustafson, Troy C. Parachute apparatus for model airplane. 4,709,884, Cl. 244-139.000.

Gustav Georg Veith GmbH & Co.: *See—*
Veith, Gustav G.; and Veith, Gotz U., 4,709,870, Cl. 242-68.000.

Guttinger, Heinz, to Sulzer-Escher Wyss AG. Method of operating a controlled deflection roll and a rolling mill equipped with at least one controlled deflection roll. 4,709,571, Cl. 72-366.000.

Guzik, Nahum E., to Guzik Technical Enterprises. Method and apparatus for control of current in a motor winding. 4,710,686, Cl. 318-293.000.

Guzik Technical Enterprises: *See—*
Guzik, Nahum E., 4,710,686, Cl. 318-293.000.

H. Lundbeck A/S: *See—*
Perregaard, Jens K., 4,710,500, Cl. 514-254.000.

Haarmann & Reimer GmbH: *See—*
Bruning, Jurgen; Emberger, Roland; Hopp, Rudolf; and Sand, Theodor, 4,710,392, Cl. 426-534.000.

Haas, Franz, Jr.: *See—*
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,710,117, Cl. 425-126.00R.

Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, to Franz Haas Waffelmaschinen Industriegesellschaft m.b.H. Apparatus for placing confectionery wafer pieces into molding depressions of casting molds. 4,710,117, Cl. 425-126.00R.

Haas, Johann: *See—*
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johann, 4,710,117, Cl. 425-126.00R.

Haase, Wayne C. Planter monitor system. 4,710,757, Cl. 340-684.000.
Habecker, John W.: *See*—
Raab, Andrew F.; and Habecker, John W., 4,710,601, Cl. 200-302.300.
Haber, Terry M., to Habley Medical Technology Corporation. Implantable blood flow and occlusion pressure sensing sphincteric system. 4,709,690, Cl. 128-1.00R.
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., to Habley Medical Technology Corporation. Anti-needle strike and anti-drug abuse syringe. 4,710,170, Cl. 604-110.000.
Haber, Terry M.; Foster, Clark B.; and Lewis, John A., Jr., to Habley Medical Technology Corporation. Snap-on vernier syringe. 4,710,179, Cl. 604-211.000.
Haberl, Fritz, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Apparatus for generating a signal providing information regarding a radiating source, especially an infrared source. 4,710,619, Cl. 250-203.00R.
Habley Medical Technology Corporation: *See*—
Haber, Terry M., 4,709,690, Cl. 128-1.00R.
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 4,710,170, Cl. 604-110.000.
Haber, Terry M.; Foster, Clark B.; and Lewis, John A., Jr., 4,710,179, Cl. 604-211.000.
Habu, Kazutaka: *See*—
Sato, Noboru; Habu, Kazutaka; and Abe, Sanae, 4,710,434, Cl. 428-678.000.
Haefner, Horst: *See*—
Czich, Erhard; Drott, Peter; and Haefner, Horst, 4,709,789, Cl. 188-73.440.
Hafner, Walter; Ritter, Peter; Gebauer, Helmut; and Regiert, Marlies, to Consortium fur Elektrochemische Industrie GmbH. Aldehydes, acetals, alcohols and ethers having 3-methyl- or 3,5-dimethyl-benzyl groups, their manufacture and perfume materials containing same. 4,710,316, Cl. 512-20.000.
Hafstrom, Warren R.: *See*—
Stacik, Harold S.; and Hafstrom, Warren R., 4,709,951, Cl. 292-189.000.
Hagedorn, Myrna L.: *See*—
Pittet, Alan O.; Muralidhara, Ranya; and Hagedorn, Myrna L., 4,709,707, Cl. 131-276.000.
Hagger, John M. R.: *See*—
Corne, Robert W.; and Hagger, John M. R., 4,709,982, Cl. 350-96.230.
Hahn, Berthold: *See*—
Nippert, Georg; Hahn, Berthold; and Gobrecht, Jens, 4,710,795, Cl. 357-65.000.
Hahn Manufacturing Co.: *See*—
Hahn, Ronald R., 4,709,853, Cl. 232-39.000.
Hahn, Ronald R., to Hahn Manufacturing Co. Adjustable platform means. 4,709,853, Cl. 232-39.000.
Hailpern, Brent T.: *See*—
Cocke, John; and Hailpern, Brent T., 4,710,868, Cl. 364-200.000.
Friedman, Lee G.; Hailpern, Brent T.; Hoevel, Lee W.; and Thefaine, Yannick J., 4,710,769, Cl. 340-825.030.
Hakanson, Hakan: *See*—
Backman, Sune; and Hakanson, Hakan, 4,710,402, Cl. 427-244.000.
Hakata, Yoshitami; Wakuda, Masanori; and Suzuki, Kimio, to Toshiba Kikai Kabushiki Kaisha. Phase modulation type digital position detector. 4,710,770, Cl. 340-870.180.
Hal Leonard Publishing Corporation: *See*—
Mardak, Keith R., 4,709,895, Cl. 248-460.000.
Halberstadt, Alex L.; and Hume, Roger A., to Thorn Emi plc. Incandescent lamps. 4,710,677, Cl. 313-580.000.
Hall, Carroll R.: *See*—
Franke, David W.; and Hall, Carroll R., 4,710,763, Cl. 340-723.000.
Hall, David W. R.: *See*—
Hofman, Petrus S.; Hall, David W. R.; and Jaitly, Kapil D., 4,710,571, Cl. 544-216.000.
Hall, Ernest M., Jr.; and Buis, Jeffrey A., to Oyo Corporation. Geophone cable splice and method. 4,710,593, Cl. 174-88.00R.
Hall Vandis, Nancy. Therapeutic doll figure. 4,710,145, Cl. 446-100.000.
Hall, William F.: *See*—
Warren, Leslie F., Jr.; Maus, Louis; and Hall, William F., 4,710,401, Cl. 427-121.000.
Hallmark Cards, Incorporated: *See*—
Knipp, Randall S.; and Loyd, Lewis, 4,710,158, Cl. 493-328.000.
Halverson, Ross, to Kaultronics, Inc. Dish antenna structure. 4,710,777, Cl. 343-840.000.
Hamada, Fukusaburo: *See*—
Ohtomo, Nobuya; Mizuno, Kyosuke; Hamada, Fukusaburo; and Mizokami, Hiroshi, 4,710,378, Cl. 424-89.000.
Hamlyn, George J., to Hamlyn Overseas Trading Company Pty Ltd. Foldable chicken holder. 4,709,626, Cl. 99-426.000.
Hamlyn Overseas Trading Company Pty Ltd: *See*—
Hamlyn, George J., 4,709,626, Cl. 99-426.000.
Hammer, Josef; and Handschuher, Walter, to M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft. Web tension control and emergency stop system. 4,709,872, Cl. 242-75.430.
Han, Man Y. Concrete lining machine. 4,710,058, Cl. 405-146.000.
Hanamura, Shoji; Aoki, Masaaki; and Masuhara, Toshiaki, to Hitachi, Ltd. Semiconductor including signal processor and transient detector for low temperature operation. 4,710,648, Cl. 307-443.000.
Hancor, Inc.: *See*—
Sidaway, H. John; and Lytle, Donald A., 4,709,723, Cl. 137-584.000.
Handschuher, Walter: *See*—
Hammer, Josef; and Handschuher, Walter, 4,709,872, Cl. 242-75.430.
Hannon, William G.: *See*—
Momot, Stanley; and Hannon, William G., 4,709,634, Cl. 101-248.000.
Hansen, Anders N., to Broen Armatur A/S. Ball valve having valve housing with interior annular ridge for holding annular retaining element in position. 4,709,902, Cl. 251-315.000.
Hansen, Charles S.: *See*—
Peters, Douglas C.; and Hansen, Charles S., 4,709,955, Cl. 296-3.000.
Hansen, Loren F.: *See*—
Broman, Donald E.; Hansen, Loren F.; and Huber, Donald J., 4,709,541, Cl. 56-202.000.
Hansen, V. Gregers: *See*—
Cantwell, Robert H.; Marksteiner, William K.; and Hansen, V. Gregers, 4,710,772, Cl. 342-92.000.
Hanson, Steven P.: *See*—
Breslow, Jeffrey D.; Morrison, Howard J.; Hanson, Steven P.; and Rasmussen, Russell G., 4,710,873, Cl. 364-410.000.
Hanson, Thomas C.; Fisher, Theodore F.; and Weber, Joseph A., to Union Carbide Corporation. Process to produce high pressure methane gas. 4,710,212, Cl. 62-23.000.
Harada, Yuho; Maruyama, Tsutomu; Kumakura, Yoshiyuki; and Kuwayama, Shigeo, to Fuji Photo Optical Co., Ltd. Method of making flexible optical fiber bundle. 4,710,216, Cl. 65-4.100.
Harada, Yutaka, to Kabushiki Kaisha Toshiba. Group control apparatus for elevators. 4,709,788, Cl. 187-124.000.
Harase, Jiro; Ohta, Kuniteru; Takeshita, Tetsurou; and Endo, Michio, to Nippon Steel Corporation. Method for producing a thin casting of Cr-series stainless steel. 4,709,742, Cl. 164-76.100.
Harata, Mitsuru: *See*—
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.
Harbolt, Bruce; Murata, Perry L.; and Burmaster, Neal C., to Union Oil Company of California. Apparatus for dissolving urea and other endothermic materials. 4,710,360, Cl. 422-269.000.
Hares, George B.: *See*—
Borrelli, Nicholas F.; Hares, George B.; Smith, Dennis W.; and Wedding, Brent M., 4,710,430, Cl. 428-432.000.
Harkiewicz, Gary A.; and Wagener, Paul W., to Westinghouse Electric Corp. Direction sensing system for an AC power supply and AC motor drive with such direction sensing system. 4,710,703, Cl. 324-86.000.
Harley, A. Dale; Duquette, Lawrence G.; Khoury, Issam A.; and Kohatsu, Iwao, to Dow Chemical Company, The. Dispersion process for ceramic green body. 4,710,227, Cl. 106-193.00R.
Harman, R. Keith: *See*—
Rich, Brian G.; Patchell, John W.; and Harman, R. Keith, 4,710,753, Cl. 340-561.000.
Harper-Wyman Company: *See*—
Cors, Craig M.; and Kadlubowski, Joseph C., 4,710,742, Cl. 337-323.000.
Harrell, Troy: *See*—
McCutcheon, Samuel; Lum, Jeffrey; Solek, Roman; Harrell, Troy; and Leman, Robert, 4,710,893, Cl. 364-900.000.
Harris Corporation: *See*—
Pelchat, Guy; and Crabtree, Luther L., 4,710,723, Cl. 329-192.000.
Harris Graphics Corporation: *See*—
Kubert, Vince T.; and Richards, John S., 4,709,635, Cl. 101-426.000.
Harris, Robert D.: *See*—
Sneyd, James C., Jr.; Harris, Robert D.; and Latimer, Margaret G., 4,710,185, Cl. 604-372.000.
Harrison, David J.: *See*—
Thompson, Thomas C.; and Harrison, David J., 4,710,166, Cl. 604-81.000.
Harrison, George W., to Team, Inc. Pipe weld repair device and method for the installation thereof. 4,709,729, Cl. 138-99.000.
Harrison, James. Automatic part and runner separator. 4,710,124, Cl. 425-554.000.
Harrod, Lawrence R., to Kransco Manufacturing, Inc. Ridable vehicle and assembly method. 4,709,958, Cl. 296-177.000.
Hartman, Creighton D.: *See*—
Moreno, Frederick E.; and Hartman, Creighton D., 4,709,643, Cl. 110-336.000.
Hartmann, Willi: *See*—
Saalbach, Kurt; and Hartmann, Willi, 4,709,551, Cl. 60-589.000.
Hartness International, Inc.: *See*—
Hartness, Robert G.; and Hartness, Thomas S., 4,709,536, Cl. 53-539.000.
Hartness, Robert G.; and Hartness, Thomas S., to Hartness International, Inc. Article transport apparatus. 4,709,536, Cl. 53-539.000.
Hartness, Thomas S.: *See*—
Hartness, Robert G.; and Hartness, Thomas S., 4,709,536, Cl. 53-539.000.
Harvey, Andrew C.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., to Foster-Miller, Inc. Separable fastening device. 4,709,453, Cl. 24-442.000.
Hasegawa, Tadashi, to Mitsubishi Denki Kabushiki Kaisha. Floppy disk r/w head assembly. 4,710,833, Cl. 360-105.000.
Hasegawa, Yoichi: *See*—
Noda, Kimihiko; Fujiura, Yoji; and Hasegawa, Yoichi, 4,710,298, Cl. 210-505.000.

Haselton, E. Fletcher: *See*—
Amstutz, Stanford R.; Eliscu, Mark; Lenart, Joseph M.; and Haselton, E. Fletcher, 4,710,916, Cl. 370-58.000.

Hashiba, Takahiro: *See*—
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.

Hashiguchi, Koichi: *See*—
Tosaka, Akio; Hashiguchi, Koichi; Morita, Masahiko; and Okano, Shinobu, 4,709,557, Cl. 62-373.000.

Hashimoto, Akio: *See*—
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Hashimoto, Takao: *See*—
Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, 4,710,215, Cl. 62-532.000.

Hashimoto, Takashi: *See*—
Nozaki, Takashi; and Hashimoto, Takashi, 4,710,971, Cl. 455-179.000.

Hashimoto, Takatsugu: *See*—
Tomita, Seisuke; and Hashimoto, Takatsugu, 4,710,541, Cl. 525-104.000.

Hata, Kenji: *See*—
Miyajima, Nobuyuki; Hata, Kenji; and Nakayama, Junichi, 4,710,313, Cl. 252-105.000.

Hatayama, Kazumi; and Hayashi, Terumine, to Hitachi, Ltd. Method and apparatus for diagnosing a LSI chip. 4,710,930, Cl. 371-25.000.

Hattori, Makoto; Nishikuri, Masao; and Ueda, Yasuyoshi, to Sumitomo Chemical Company, Limited. Method for producing 1-amino-2-phenoxy-4-hydroxyanthraquinones. 4,710,320, Cl. 260-378.000.

Hattori, Michihiro: *See*—
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.

Haug, Kurt; and Peterssen, Rudolf, to Robert Bosch GmbH. Headlight-blinking light unit for passenger cars. 4,710,857, Cl. 362-80.000.

Hauke, Gunter: *See*—
Wermuth, Stefan; Hauke, Gunter; and Kreher, Klaus, 4,710,289, Cl. 210-198.200.

Hawkins, Clive F. J., to PAG Limited; and PAG America Ltd. Battery connector. 4,709,974, Cl. 439-345.000.

Hayama, Mamoru, to Mazda Motor Corporation. Cruise control system for vehicle. 4,709,595, Cl. 74-864.000.

Hayashi, Hiroshi: *See*—
Nakano, Kikuo; and Hayashi, Hiroshi, 4,710,435, Cl. 428-698.000.

Hayashi, Seiichi; Nakamura, Takashi; and Tanabe, Hisayuki, to Seiko Epson Corporation; and Nippon Kores Kabushiki Kaisha. Current-applying thermal transfer film. 4,710,782, Cl. 346-76.00R.

Hayashi, Shinichi: *See*—
Saitoh, Takashi; Niizaki, Nobuya; Yamamura, Hideho; and Hayashi, Shinichi, 4,710,654, Cl. 307-601.000.

Hayashi, Tadamasa; and Mizushima, Toyoshi, to Ebara Corporation. Apparatus for subjecting a radioactive sodium borate waste solution to volume reduction and solidification. 4,710,266, Cl. 159-7.000.

Hayashi, Terumine: *See*—
Hatayama, Kazumi; and Hayashi, Terumine, 4,710,930, Cl. 371-25.000.

Hayashi, Toshihide; Yamakami, Osamu; and Kanayama, Ikuo, to Sony Corporation. SHF receiver. 4,710,972, Cl. 455-179.000.

Hayashi, Yasuyuki: *See*—
Suzuki, Hideo; Okamoto, Kunihide; Hayashi, Yasuyuki; and Aiba, Mitsuru, 4,709,934, Cl. 280-6.00R.

Hayashibara, Ken: *See*—
Masaki, Kazumi, 4,710,655, Cl. 310-30.000.
Masaki, Kazumi, 4,710,698, Cl. 323-239.000.

Hayden, Richard F.: *See*—
Broderick, Thomas B.; Algrim, Donald J.; and Haydén, Richard F., 4,709,523, Cl. 52-406.000.

Hayes-Ivy Manufacturing Inc.: *See*—
Knight, Silsby H., 4,709,715, Cl. 134-172.000.

Hazlegrove, Billy M.; and Roberts, Richard A., to Brown & Root, Inc. Method and apparatus for simultaneous trenching and pipe laying in an arctic environment. 4,710,059, Cl. 405-162.000.

Headen, James, to Radian Tool Corporation. Method of manufacturing unidirectional drive tool. 4,709,598, Cl. 76-114.000.

Heath, Allen W., to International Business Machines Corporation. Table driven print formatting. 4,710,886, Cl. 364-519.000.

Heess, Gerhard; and van Zanten, Anton, to Robert Bosch GmbH. Brake pressure booster in vehicle brake systems. 4,709,969, Cl. 303-114.000.

Hefner, Heinz-Achim: *See*—
Waschler, Eckehard; Clauss, Hermann; and Hefner, Heinz-Achim, 4,710,264, Cl. 437-228.000.

Hehl, Karl. Injection mold changing unit. 4,710,121, Cl. 425-190.000.

Hehn, Bruce A.; and Sankey, James K., to Alpha Enterprises, Inc. Compact disc cleaner. 4,709,437, Cl. 15-97.00R.

Heil, Balint: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Hein, Klaus R. G.: *See*—
Gebhard, Georg R. U.; Hein, Klaus R. G.; and Glaser, Wolfgang, 4,710,365, Cl. 423-244.000.

Heine, Hans-Georg: *See*—
Meier, Helmut-Martin; Heine, Hans-Georg; Pischtschan, Alfred; Dhein, Rolf; and Rudolph, Hans, 4,710,529, Cl. 524-139.000.

Heisinger, Robert F., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Modular protector for telecommunications equipment. 4,710,846, Cl. 361-119.000.

Hekimian Laboratories, Inc.: *See*—
Bailey, George, 4,710,890, Cl. 364-703.000.

Helary, Louis J.; and Grenon, Pierre, to Et.Lemer & Cie. Structure assemblable and disassemblable on a racking site for the storage of nuclear reactor fuel elements. 4,710,342, Cl. 376-272.000.

Helena Laboratories Corporation: *See*—
Mayes, David G., 4,709,810, Cl. 206-205.000.

Hella KG Hueck & Co.: *See*—
Urbschat, Ulrich, 4,710,855, Cl. 362-66.000.

Heller, Jorge; Skinner, Wilfred A.; Saito, Kenichiro; and Satoh, Susumu, to Nitto Electric Industrial Co., Ltd. Method for percutaneously administering physiologically active agents. 4,710,497, Cl. 514-221.000.

Hembree, Charles B.; and Shea, Brian T., to Wing Aero. Glass cutting device. 4,709,483, Cl. 33-18.100.

Henderson, James S., to New Holland Inc. Expelled deflector for manure spreaders. 4,709,861, Cl. 239-675.000.

Henne, Heinrich; Patzelt, Norbert; Schneider, Lutz T.; Knobloch, Osbert; and Muller, Manfred, to Krupp Polysius AG. Method and apparatus for the crushing of material. 4,709,864, Cl. 241-167.000.

Hennon, Erin D.; and Keller, Thomas J., to Dana Corporation. Bearing cap assembly. 4,710,038, Cl. 384-569.000.

Henri, Leonard; and Seigneurin, Michel, to Micro-Mega S.A. Precision injection system and method for intraligmental anesthesia. 4,710,178, Cl. 604-209.000.

Henrich, Hans-Otto; and Rienecker, Reimund, to J. M. Voith GmbH. Fibrous suspension pressurized sorter. 4,710,287, Cl. 209-270.000.

Henry, Allan F.: *See*—
Bernard, John A.; Henry, Allan F.; Lanning, David D.; and Kwok, Kwan S., 4,710,341, Cl. 376-216.000.

Henry Ford Hospital: *See*—
Levin, Nathan W.; and Zasuwa, Gerard A., 4,710,164, Cl. 604-66.000.

Hercules Incorporated: *See*—
Kraus, Wayne A., 4,710,408, Cl. 427-393.500.

Hereth, Michael R.; and Martin, Patricia A., to Wang Laboratories, Inc. Pseudo-static memory subsystem. 4,710,903, Cl. 365-194.000.

Herlemann, Werner: *See*—
Paerisch, Jochen; Herlemann, Werner; and Schaetzler, Walter, 4,709,959, Cl. 296-217.000.

Hermann Berstorff Maschinenbau GmbH: *See*—
Voigt, Jurgen, 4,710,113, Cl. 425-67.000.

Hermann, George D.: *See*—
Johnston, James H.; Hermann, George D.; and Atagi, Tanya A., 4,709,698, Cl. 128-303.120.

Hersevoort, Aart: *See*—
Uiterwaal, Dirk J. D.; and Hersevoort, Aart, 4,710,387, Cl. 426-72.000.

Hershberger, Charles L.; and Larson, Jeffrey L., to Eli Lilly and Company. Method of cloning modified streptomycetes DNA. 4,710,466, Cl. 435-91.000.

Hershey Foods Corporation: *See*—
Holmgren, Mark E.; Parrish, Gregory K.; and Cartier, Philip A., 4,710,393, Cl. 426-660.000.

Herzog, Hans-J.: *See*—
Dambkes, Heinrich; Herzog, Hans-J.; and Jorke, Helmut, 4,710,788, Cl. 357-22.000.

Herzog, Michael. Rotary feeder to orient and feed bottle caps and similar parts. 4,709,798, Cl. 198-380.000.

Heule, Heinrich. Cone drill bit. 4,710,072, Cl. 408-18.000.

Hewlett-Packard Company: *See*—
Lacey, Richard F., 4,710,001, Cl. 350-632.000.

Heyn, Lynn E.; Johnson, Malcolm L.; and Fischer, Danial O., to Kimberly-Clarke Corporation. Cover garment with inner garment access option. 4,709,419, Cl. 2-46.000.

Heyne, Carl J.; and Tomasic, Nicholas A., to Westinghouse Electric Corp. Circuit breaker having shock-proof trip-actuating assembly. 4,710,739, Cl. 335-174.000.

Hicks, John W., Jr., to Polaroid Corporation. Ensheathed optical fiber and coupling method. 4,709,986, Cl. 350-96.330.

Higashi, Michiya: *See*—
Ikeya, Hirotoshi; and Higashi, Michiya, 4,710,796, Cl. 357-72.000.

Higashihara, Toshio: *See*—
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, 4,710,913, Cl. 369-280.000.

High Resolution Television, Inc.: *See*—
Songer, Jimmie D., 4,710,799, Cl. 358-12.000.

Higomura, Makoto, to Canon Kabushiki Kaisha. Control system for positioning an object using switching from a speed control mode to a position control mode with adjustable brain. 4,710,865, Cl. 364-170.000.

Higuchi, Misao, to NEC Corporation. Non-volatile semiconductor memory device having an improved write circuit. 4,710,900, Cl. 365-189.000.

Hiketa, Manabu: *See*—
Watanabe, Kenichi; Hiruta, Hideshi; and Hiketa, Manabu, 4,709,775, Cl. 180-233.000.

Hill, Donnie K.: *See*—
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., 4,710,214, Cl. 62-28.000.
Hill, Kevin E., to Milsco Manufacturing Company. Self-releasing ratchet-type seat adjustment. 4,709,961, Cl. 297-284.000.
Hillemann, Craig L., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,710,221, Cl. 71-93.000.
Himmelmann, Wolfgang: *See*—
Langen, Hans; Schutz, Heinz-Dieter; Himmelmann, Wolfgang; Wernicke, Ubbo; and Renner, Gunter, 4,710,454, Cl. 430-546.000.
Himont Incorporated: *See*—
Bertelli, Guido; and Locatelli, Renato, 4,710,528, Cl. 524-100.000.
Hinch, Henry H.; Boyne, Gail E.; Daniels, David L.; and Kullmann, Eugene V., to Amoco Corporation. Method and apparatus for X-ray video fluoroscopic analysis of rock samples. 4,710,946, Cl. 378-62.000.
Hinkel, Holger: *See*—
Bandara, Upali; Hinkel, Holger; Steiner, Werner; and Trippel, Gerhard, 4,710,424, Cl. 428-325.000.
Hinoda, Seisuke: *See*—
Hirano, Masao; Kato, Mitsutaka; Yasuda, Hirohiko; and Hinoda, Seisuke, 4,710,033, Cl. 374-161.000.
Hirabayashi, Shigeto; Matsuzaka, Syoji; Ohya, Yukio; and Nonaka, Yoshiyuki, to Konishiroku Photo Industry Co., Ltd. Silver halide color photographic material. 4,710,453, Cl. 430-505.000.
Hirakawa, Tadashi: *See*—
Nishimura, Kunio; and Hirakawa, Tadashi, 4,710,432, Cl. 428-542.800.
Hirano, Masao; Kato, Mitsutaka; Yasuda, Hirohiko; and Hinoda, Seisuke, to Omron Tateisi Electronics Co. Temperature measurement system. 4,710,033, Cl. 374-161.000.
Hirao, Eiji: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.
Hirao, Tadashi, to Mitsubishi Denki Kabushiki Kaisha. Method of making a bipolar transistor with polycrystalline contacts. 4,709,469, Cl. 437-63.000.
Hirata, Ichiro: *See*—
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.
Hirose, Ichiro; and Sagawa, Takayoshi, to Japan Tobacco & Salt Public Corporation, The. Cigarette filter, method and apparatus for making same. 4,709,711, Cl. 131-336.000.
Hiroshi, Kashiwagi, to Hiroshi, Kashiwagi. Method of and apparatus for fault detection in digital circuits by comparison of test signals applied to a test circuit and a faultless reference circuit. 4,710,932, Cl. 371-25.000.
Hiroyasu Funakubo & Sumitomo Elec. Ind., Ltd.: *See*—
Sekiguchi, Yukio; Funakubo, Hiroyasu; Sakanoue, Hitoyuki; and Komura, Osamu, 4,709,844, Cl. 228-3.100.
Hirsch, Werner: *See*—
Junemann, Gitta; Hirsch, Werner; and Weiss, Arno, 4,709,709, Cl. 131-306.000.
Hiruta, Hideshi: *See*—
Watanabe, Kenichi; Hiruta, Hideshi; and Hiketa, Manabu, 4,709,775, Cl. 180-233.000.
Hishi, Yuichi, to Alps Electric Co., Ltd. Magnetic head. 4,710,836, Cl. 360-106.000.
Hishinuma, Kazuhiro: *See*—
Nakajima, Nobuyoshi; and Hishinuma, Kazuhiro, 4,710,875, Cl. 364-414.000.
Hitachi Construction Machinery Co., Ltd.: *See*—
Tokairin, Hiroaki; Honma, Kazuo; Nakajima, Kichio; Nagasawa, Kiyoshi; and Aritake, Takeshi, 4,710,884, Cl. 364-513.000.
Hitachi Device Engineering Co., Ltd.: *See*—
Matsuyama, Shigeru; Kanazaki, Mikio; Aoki, Norio; and Ishii, Akira, 4,709,993, Cl. 350-339.00F.
Hitachi Electronics Engineering Co., Ltd.: *See*—
Saitoh, Takashi; Niizaki, Nobuya; Yamamura, Hideho; and Hayashi, Shinichi, 4,710,654, Cl. 307-601.000.
Hitachi, Ltd.: *See*—
Hanamura, Shoji; Aoki, Masaaki; and Masuhara, Toshiaki, 4,710,648, Cl. 307-443.000.
Hatayama, Kazumi; and Hayashi, Terumine, 4,710,930, Cl. 371-25.000.
Homma, Yoshio; and Nishida, Takashi, 4,710,398, Cl. 437-235.000.
Horiuchi, Susumu; and Tamata, Shin, 4,710,318, Cl. 252-628.000.
Ishitani, Tohru; Todokoro, Hideo; Kawanami, Yoshimi; and Tamura, Hifumi, 4,710,632, Cl. 250-396.00R.
Kawasaki, Katsuhiro, 4,710,640, Cl. 250-492.200.
Kubo, Kanji; and Wakai, Katsuro, 4,710,894, Cl. 364-900.000.
Matsuyama, Shigeru; Kanazaki, Mikio; Aoki, Norio; and Ishii, Akira, 4,709,993, Cl. 350-339.00F.
Mouri, Yasunori; and Sugiura, Noboru, 4,710,881, Cl. 364-431.080.
Nishimura, Yutaka; and Oyama, Yoshishige, 4,709,581, Cl. 73-202.000.
Saiki, Eisaku; and Kawauchi, Masataka, 4,709,911, Cl. 271-10.000.
Saitoh, Takashi; Niizaki, Nobuya; Yamamura, Hideho; and Hayashi, Shinichi, 4,710,654, Cl. 307-601.000.
Suzuki, Yasunaga; Matsubara, Toshiaki; and Uragami, Akira, 4,710,842, Cl. 361-88.000.
Tsuyoshi, Toshiaki; Yonezawa, Seiji; Kasai, Masuo; and Uno, Motoo, 4,710,909, Cl. 369-46.000.
Ueda, Akihisa, 4,710,928, Cl. 371-16.000.
Usagawa, Toshiyuki; Ono, Yuichi; and Takahashi, Susumu, 4,710,787, Cl. 357-16.000.
Yamada, Kimitoshi, 4,710,762, Cl. 340-721.000.
Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, 4,710,854, Cl. 361-414.000.
Hitachi Maxell, Ltd.: *See*—
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, 4,709,816, Cl. 206-444.000.
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, 4,710,913, Cl. 369-280.000.
Hitachi Zosen Corporation: *See*—
Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, 4,709,714, Cl. 134-89.000.
Ho, Chien-Han: *See*—
Lin, Jong-Tsuen; and Ho, Chien-Han, 4,710,612, Cl. 219-547.000.
Ho, Jim Y. W., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Computer controlled constant concentration and size particulate general system. 4,710,887, Cl. 364-555.000.
Hodge, Edwin S.: *See*—
Saller, Henry A., deceased; Hodge, Edwin S.; Paprocki, Stanley J.; and Dayton, Russell W., 4,709,848, Cl. 228-159.000.
Hoechst AG: *See*—
Plum, Helmut, 4,710,556, Cl. 526-273.000.
Hoechst Aktiengesellschaft: *See*—
Metz, Hans J., 4,710,322, Cl. 260-511.000.
Hoechst CeramTec Aktiengesellschaft: *See*—
Ziebig, Anton; Brigasky, Hans; and Lewand, Willi, 4,710,123, Cl. 425-464.000.
Hoechst Roussel Pharmaceuticals, Inc.: *See*—
Strupczewski, Joseph T., 4,710,573, Cl. 546-199.000.
Hoesch Aktiengesellschaft: *See*—
Lepand, Heinz; Huser, Margrit; Biniasz, Franz-Josef; and Fuchs, Axel, 4,710,244, Cl. 148-333.000.
Hoevel, Lee W.: *See*—
Friedman, Lee G.; Hailpern, Brent T.; Hoevel, Lee W.; and Thefaine, Yannick J., 4,710,769, Cl. 340-825.030.
Hofer, Peter, to Euroceltique S.A. 6-thioxanthine derivatives. 4,710,503, Cl. 514-263.000.
Hoffman, William F.: *See*—
Willard, Alvin K.; Novello, Frederick C.; Hoffman, William F.; and Cragoe, Edward J., Jr., 4,710,513, Cl. 514-460.000.
Hoffmann, Gerhard; Hofmann, Reiner; and Elzer, Albert, to BASF Aktiengesellschaft. Photosensitive recording materials. 4,710,446, Cl. 430-281.000.
Hoffmann, Rainer: *See*—
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.
Hofman, Petrus S.; Hall, David W. R.; and Jaitly, Kapil D., to Gist-Brocades N.V. 1H-imidazol-1-ethanol esters. 4,710,571, Cl. 544-216.000.
Hofmann, Reiner: *See*—
Hoffmann, Gerhard; Hofmann, Reiner; and Elzer, Albert, 4,710,446, Cl. 430-281.000.
Hofstetter, Edward M.: *See*—
Feldman, Joel A.; and Hofstetter, Edward M., 4,710,959, Cl. 381-36.000.
Hofstetter, Robert W., Jr.: *See*—
Green, Stephen H.; Hofstetter, Robert W., Sr; and Hofstetter, Robert W., Jr., 4,709,802, Cl. 198-465.100.
Hofstetter, Robert W., Sr: *See*—
Green, Stephen H.; Hofstetter, Robert W., Sr; and Hofstetter, Robert W., Jr., 4,709,802, Cl. 198-465.100.
Hohmann, Eugen; Mund, Konrad; and Weidlich, Erhard, to Siemens Aktiengesellschaft. Method and apparatus for cleaning, disinfecting and sterilizing medical instruments. 4,710,233, Cl. 134-1.000.
Hokushin Kogyo Kabushiki Kaisha: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.
Holbrook, Philip: *See*—
Bradley, William B.; and Holbrook, Philip, 4,710,906, Cl. 367-35.000.
Holck, Jens-Peter: *See*—
Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, 4,710,510, Cl. 514-394.000.
Holder, James D.: *See*—
Greene, Hugh W.; Holder, James D.; and Knaur, James A., 4,710,912, Cl. 369-218.000.
Holland, Alex, to Fairchild Semiconductor Corporation. Method and apparatus for improving the accuracy and resolution of an analog-to-digital converter (ADC). 4,710,747, Cl. 340-347.0AD.
Hollandse Signaalapparaten B.V.: *See*—
Gietema, Jouke; and Oude Elberink, Bernard H. M., 4,710,773, Cl. 342-185.000.
Holle, Wilhelm: *See*—
Ziemer, Wolf; Neubert, Fritz; and Holle, Wilhelm, 4,710,208, Cl. 55-355.000.

Hollister Incorporated: *See*—
Bryson, Robert M., 4,710,182, Cl. 604-339.000.
Holmgren, Mark E.; Parrish, Gregory K.; and Cartier, Philip A., to Hershey Foods Corporation. Low water activity confection composition. 4,710,393, Cl. 426-660.000.
Holmqvist, Ulf: *See*—
Skoog, Hans; Holmqvist, Ulf; and Tellden, Leif, 4,710,092, Cl. 414-729.000.
Holzberger, Johann: *See*—
Cremosnik, Gregor; Timper, Joachim; and Holzberger, Johann, 4,709,875, Cl. 244-3.130.
Hom, Jorgen: *See*—
Edlund, Roy; and Hom, Jorgen, 4,709,932, Cl. 277-165.000.
Homma, Yoshio; and Nishida, Takashi, to Hitachi, Ltd. Semiconductor device and manufacturing method thereof. 4,710,398, Cl. 437-235.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Ichihara, Eiichi; and Iwai, Itsuo, 4,709,667, Cl. 123-90.340.
Motodate, Shoji; Morino, Yuichi; and Kurata, Norihiro, 4,710,599, Cl. 200-61.850.
Saito, Naoyuki; and Ozawa, Motoo, 4,709,774, Cl. 180-229.000.
Sakai, Shino; and Nishikawa, Masao, 4,709,792, Cl. 192-0.044.
Shimizu, Keiichi; Kikuchi, Sanae; and Nakano, Hitoshi, 4,709,931, Cl. 277-153.000.
Tashiro, Yutaka; and Sano, Shoichi, 4,709,936, Cl. 280-91.000.
Yagi, Shizuo; Kawai, Makoto; and Yamamoto, Yorihisa, 4,709,678, Cl. 123-425.000.
Honegger, Werner, to Ferag AG. Removable divider wall cell wheel apparatus for processing printed products. 4,709,910, Cl. 270-55.000.
Honeywell Inc.: *See*—
Broden, David E.; Martwick, Wilford E.; and Warren, John B., 4,709,638, Cl. 102-522.000.
Deetz, David W.; and Kreevoy, Maurice M., 4,710,205, Cl. 55-158.000.
Doddapaneni, Narayan, 4,710,437, Cl. 429-101.000.
Wamstad, David B., 4,710,744, Cl. 338-4.000.
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, to Toyoda Gosei Co., Ltd. Steering wheel for vehicles. 4,709,944, Cl. 280-777.000.
Honma, Kazuo: *See*—
Tokairin, Hiroaki; Honma, Kazuo; Nakajima, Kichio; Nagasawa, Kiyoshi; and Aritake, Takeshi, 4,710,884, Cl. 364-513.000.
Hoogenboom, Leo; Jackson, Robert L., Jr.; Kraft, Russell P.; and Offt, Alan M., to Mechanical Technology Incorporated. Machine vision differential measurement system. 4,710,808, Cl. 358-107.000.
Hopp, Rudolf: *See*—
Bruning, Jurgen; Emberger, Roland; Hopp, Rudolf; and Sand, Theodor, 4,710,392, Cl. 426-534.000.
Hori, Kouichi: *See*—
Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, 4,710,161, Cl. 494-84.000.
Horikawa, Izumi: *See*—
Okamoto, Yoshiharu; Horikawa, Izumi; and Komaki, Shozo, 4,710,975, Cl. 455-276.000.
Horiuchi, Susumu; and Tamata, Shin, to Hitachi, Ltd. Method of processing radioactive waste. 4,710,318, Cl. 252-628.000.
Horiuchi, Yasuhiro: *See*—
Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, 4,710,106, Cl. 417-213.000.
Horn, Charles, deceased (by Horn, Dorothy E., executor); and Jenkins, William R., to Vulcan Tool Company. Machine for cold forming small tubular elements. 4,709,574, Cl. 72-405.000.
Horn, Dorothy E., executor: *See*—
Horn, Charles, deceased; and Jenkins, William R., 4,709,574, Cl. 72-405.000.
Hornbeck, Larry J., to Texas Instruments Incorporated. Spatial light modulator and method. 4,710,732, Cl. 332-7.510.
Horstmann, Harald: *See*—
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, 4,710,491, Cl. 514-42.000.
Hosan, Hans-Josef: *See*—
Freitag, Herbert; Fuhrmann, Castor; and Hosan, Hans-Josef, 4,709,790, Cl. 188-300.000.
Hoshi, Akimitsu: *See*—
Ishikawa, Tadashi; Matsuo, Kazuhiro; and Hoshi, Akimitsu, 4,709,915, Cl. 271-288.000.
Hoshikawa, Jun, to Seiko Epson Kabushiki Kaisha. Liquid crystal display with barrier layer to reduce permeability. 4,709,991, Cl. 350-339.00R.
Hoshino, Isamu: *See*—
Sugita, Mitsuyuki; and Hoshino, Isamu, 4,710,731, Cl. 331-158.000.
Hosiden Electronics Co. Ltd.: *See*—
Shichida, Akihito, 4,710,139, Cl. 439-668.000.
Hostetler, Eldon, to Ziggity Systems, Inc. Cage anchor for watering device. 4,709,658, Cl. 119-18.000.
Hotta, Hajime: *See*—
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.
Hotta, Tadahiko, to Nippon Gakki Seizo Kabushiki Kaisha. Method of producing semiconductor integrated circuit having parasitic channel stopper region. 4,710,265, Cl. 437-29.000.
Hotzel, Gerhard: *See*—
Schlechtriemen, Gerhard-Ludwig; Hotzel, Gerhard; and Weppner, Werner, 4,710,848, Cl. 361-280.000.
Houghton, Benjamin T., to Enidine Incorporated. Adjustable double-acting damper. 4,709,791, Cl. 188-315.000.
Houkes, Henk; Postma, Pieter; and Van Veghel, Andreas C., to U.S. Philips Corporation. Electrodeless low-pressure discharge lamp. 4,710,678, Cl. 315-39.000.
Houston, Mary B.: *See*—
Schumacher, Robert W.; and Houston, Mary B., 4,710,390, Cl. 426-285.000.
Howard, Don R.: *See*—
Butts, J. James, Jr.; and Howard, Don R., 4,709,580, Cl. 73-178.00R.
Howard, P. Guy, to Spectra-Physics, Inc. Variable power gas laser tube. 4,710,942, Cl. 372-87.000.
Howe, Stephen H.; and Rogers, Donald. Setting the orientation of crystals. 4,710,259, Cl. 156-601.000.
Howmet Turbine Components Corporation: *See*—
Freeman, William R., Jr., 4,709,461, Cl. 29-526.300.
Hozer, Norman R. Method and bath for electro-chemically resharpening of cutting tools. 4,710,279, Cl. 204-129.550.
Hrushesky, William J. M., to University of Minnesota, Regents of the. Instrument and method for accessing vessels and tissues within animals. 4,709,660, Cl. 119-103.000.
Huang, Shyh-Chin; Chang, Keh-Minn; and Taub, Alan I., to General Electric Company. Rapidly solidified tri-nickel aluminide base alloy. 4,710,247, Cl. 148-429.000.
Huber, Donald J.: *See*—
Broman, Donald E.; Hansen, Loren F.; and Huber, Donald J., 4,709,541, Cl. 56-202.000.
Huff, Joel R.: *See*—
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., 4,710,504, Cl. 514-267.000.
Huggard, Mark T., to Mobil Oil Corporation. Foamable composition and process for forming same. 4,710,522, Cl. 521-138.000.
Hughes Aircraft Company: *See*—
Chen, John Y., 4,710,477, Cl. 437-34.000.
Ellion, M. Edmund, 4,710,588, Cl. 136-206.000.
Linder, Jacques F., 4,710,448, Cl. 430-314.000.
Hui, Henry T.: *See*—
Smart, Leonard G.; and Hui, Henry T., 4,709,886, Cl. 248-49.000.
Huiser, Andre M. J.: *See*—
Baltes, Heinrich P.; and Huiser, Andre M. J., 4,710,627, Cl. 250-339.000.
Hull, Ezekiel H.; and Frappier, Edward P., to Morflex Chemical Company, Inc. Medical article and method. 4,710,532, Cl. 524-310.000.
Hultsch, Guenther: *See*—
Alstetter, Franz; and Hultsch, Guenther, 4,710,356, Cl. 422-140.000.
Hume, Roger A.: *See*—
Halberstadt, Alex L.; and Hume, Roger A., 4,710,677, Cl. 313-580.000.
Hundt, Gary W.: *See*—
Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., 4,709,833, Cl. 220-319.000.
Hunt, John. Water skis and the like. 4,710,144, Cl. 441-79.000.
Hunter, John J. Lined pipe joint. 4,709,946, Cl. 285-55.000.
Hupfer, Ronald K., to Whirlpool Corporation. Heat exchanger tube retainer for a refrigerator condenser. 4,709,556, Cl. 62-298.000.
Huser, Margrit: *See*—
Lepand, Heinz; Huser, Margrit; Biniasz, Franz-Josef; and Fuchs, Axel, 4,710,244, Cl. 148-333.000.
Huthwohl, Georg: *See*—
Pischinger, Franz; Lepperhoff, Gerhard; and Huthwohl, Georg, 4,709,547, Cl. 60-274.000.
Huttner, Klaus, to SKF GmbH. Cage for roller bearing. 4,710,039, Cl. 384-574.000.
Huyck Corporation: *See*—
Kinnunen, Martti I., 4,709,732, Cl. 139-383.00A.
Hwang, Yin-Chao: *See*—
Powell, Theo J.; Bellay, Jeffrey D.; Daniels, Martin D.; and Hwang, Yin-Chao, 4,710,933, Cl. 371-25.000.
Hyrman, Vaclav. Electro convulsive therapy method. 4,709,700, Cl. 128-421.000.
I&H Conveying & Machine Company: *See*—
Green, Stephen H.; Hofstetter, Robert W., Sr; and Hofstetter, Robert W., Jr., 4,709,802, Cl. 198-465.100.
Ichihara, Eiichi; and Iwai, Itsuo, to Honda Giken Kogyo Kabushiki Kaisha; and Tanaka Machine Industries Co., Ltd. Oil supply device for valve operating system having hydraulic tappet in internal combustion engine. 4,709,667, Cl. 123-90.340.
Ichihara, Yutaka: *See*—
Magome, Nobutaka; and Ichihara, Yutaka, 4,710,026, Cl. 356-349.000.
Ichikawa, Noriyuki; Suzuki, Tetsushi; and Atsumi, Tomiaki, to Toyota Jidosha Kabushiki Kaisha. Crank damper pulley structure for the internal combustion engine of a car. 4,710,152, Cl. 474-166.000.
Ichimaru, Yoshiro; Kobayashi, Shigeru; and Ohashi, Toshio, to Nissan Motor Company, Limited. Vehicular air conditioner with defogging feature. 4,709,751, Cl. 165-17.000.
ICI Americas Inc.: *See*—
Nelson, Richard V.; and Stephen, John F., 4,710,527, Cl. 524-98.000.

ICI Australia Limited: *See*—
Yates, David E.; and Dack, Stuart W., 4,710,248, Cl. 149-21.000.
Ide, Yuji, to Kabushiki Kaisha Toshiba. Color filter arrays for use in a single chip color television pickup system using the field integration mode. 4,710,804, Cl. 358-48.000.
Ideal Security Hardward Corporation: *See*—
Waldo, Russell W.; and Miller, Cardell E., 4,709,445, Cl. 16-300.000.
Iguchi, Keisuke; and Ebato, Seigo, to Mitsubishi Paper Mills, Ltd. Novel silver halide crystal and process for production of same. 4,710,455, Cl. 430-567.000.
Iijima, Hitoshi: *See*—
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
Iijima, Shigeharu: *See*—
Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, 4,710,418, Cl. 428-192.000.
Iizuka, Michio; and Shiba, Haruo, to TDK Corporation. Magnetic disc cartridge. 4,710,839, Cl. 360-133.000.
Ikeda Bussan Co., Ltd.: *See*—
Seura, Yasuyuki, 4,709,964, Cl. 297-354.000.
Ikeda, Hiroaki: *See*—
Funaki, Shinsuke; Akanabe, Yuichi; and Ikeda, Hiroaki, 4,710,779, Cl. 346-1.100.
Ikeda Mohando Co., Ltd.: *See*—
Nohara, Fujio; and Fujinawa, Tomoaki, 4,710,498, Cl. 514-242.000.
Ikeda, Takenori: *See*—
Okoshi, Noboru; Motomura, Masatoshi; Ohtsubo, Mitsuru; and Ikeda, Takenori, 4,710,230, Cl. 106-308.00N.
Ikeya, Hirotoshi; and Higashi, Michiya, to Kabushiki Kaisha Toshiba. Resin encapsulation type semiconductor device by use of epoxy resin composition. 4,710,796, Cl. 357-72.000.
Illig, Egon; and Kniep, Volkmar, to Fraumhofer-Gesellschaft zur Forderung der angewandten Forschung e.v. Apparatus for separating and conveying sheet-like articles. 4,709,912, Cl. 271-42.000.
Illinois Tool Works Inc.: *See*—
Erickson, David A., 4,709,889, Cl. 248-74.500.
IMAG-Verlage AG fur Immaterialguterrecht: *See*—
Petschner, Goetz, 4,710,967, Cl. 383-8.000.
Imai, Akio; Okamoto, Yasushi; and Saito, Masatoshi, to Sumitomo Chemical Company, Limited. Polybutadiene and process for preparing the same. 4,710,554, Cl. 526-180.000.
Imai, Hiroshi; and Yoshioka, Kouichi, to Mitsubishi Denki Kabushiki Kaisha. Sealed disc drive assembly with internal air filter. 4,710,830, Cl. 360-97.000.
Imaizumi, Haruo: *See*—
Tanaka, Satoshi; and Imaizumi, Haruo, 4,710,353, Cl. 422-68.000.
Imamura, Tomotsu, to Ricoh Company, Ltd. Device for stabilizing photosensor output to varying temperature. 4,710,622, Cl. 250-214.00R.
Imamura, Tosuke, to Teijin Limited. Woven polyester webbing for safety belts. 4,710,423, Cl. 428-272.000.
Imokawa, Genji: *See*—
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.
Imperial Chemical Industries Plc: *See*—
Norris, Alan J., 4,710,849, Cl. 361-228.000.
Imreg, Inc.: *See*—
Gottlieb, A. Arthur, 4,710,380, Cl. 424-101.000.
INA Walzlager Schaeffler KG: *See*—
Klug, Horst; Mocker, Wolfgang; Schaeffler, George; and Speil, Walter, 4,709,668, Cl. 123-90.550.
Inatsuki, Kenichi, to Fuji Photo Film Co., Ltd. Method of reading image data. 4,710,818, Cl. 358-214.000.
Inco Engineered Products Ltd.: *See*—
Law, Anthony G.; and Fleetwood, Michael J., 4,709,743, Cl. 164-463.000.
Indak Manufacturing Corp.: *See*—
Raab, Andrew F.; and Habecker, John W., 4,710,601, Cl. 200-302.300.
Independent Broadcasting Authority: *See*—
Douglas, Peter G.; and Kyffin, Morris N., 4,710,815, Cl. 358-186.000.
Infinity Boring Tool Company: *See*—
Peterson, Richard L., 4,710,073, Cl. 408-181.000.
Ingersoll Milling Machine Company, The: *See*—
Lewis, Henry W.; and Van Roojen, Jan, 4,709,465, Cl. 29-568.000.
Ingle, John W. Rescue launcher. 4,709,650, Cl. 114-375.000.
Innes, Robert S.: *See*—
McGuire, Bernie; Innes, Robert S.; and Pagowski, Stefan, 4,709,448, Cl. 17-11.000.
Inoue, Mamoru: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.
Inoue, Nanao: *See*—
Saito, Koichi; Fujimura, Yoshihiko; and Inoue, Nanao, 4,710,780, Cl. 346-1.100.
Institut Francais du Petrole: *See*—
Behar, Francoise; Roucache, Jeannine; Auger, Jean; and Boudet, Luc, 4,710,354, Cl. 422-80.000.
Institut Gornogo Dela So An USSR: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.
Institut Khimii AN: *See*—
Voll, Martin A.; Eiskop, Robert K.; and Yankovsky, Kharri I., 4,709,584, Cl. 73-864.440.
Integrated Device Technology, Inc.: *See*—
Miller, Michael J., 4,710,927, Cl. 371-15.000.
Intel Corporation: *See*—
Young, Ian, 4,710,647, Cl. 307-297.000.
Interatom GmbH: *See*—
Tittizer, Gabriel; Junghans, Ewald; Bestenreiner, Georg; and Dahm, Christian, 4,710,034, Cl. 384-110.000.
Interferon Sciences, Inc.: *See*—
Evans, Sean A.; Terpinski, Eva A.; and Testa, Douglas, 4,710,376, Cl. 424-83.000.
International Business Machines Corporation: *See*—
Bandara, Upali; Hinkel, Holger; Steiner, Werner; and Trippel, Gerhard, 4,710,424, Cl. 428-325.000.
Chu, Richard C.; and Simons, Robert E., 4,709,754, Cl. 165-133.000.
Cocke, John; and Hailpern, Brent T., 4,710,868, Cl. 364-200.000.
Friedman, Lee G.; Hailpern, Brent T.; Hoevel, Lee W.; and Thefaine, Yannick J., 4,710,769, Cl. 340-825.030.
Heath, Allen W., 4,710,886, Cl. 364-519.000.
Iwai, Shinichi; and Uno, Sakae, 4,710,806, Cl. 358-81.000.
Kunzinger, Charles A., 4,710,801, Cl. 358-23.000.
Litteken, Mark A., 4,710,885, Cl. 364-518.000.
Scarborough, Randolph G., 4,710,872, Cl. 364-300.000.
International Flavors & Fragrances Inc.: *See*—
Pittet, Alan O.; Muralidhara, Ranya; and Hagedorn, Myrna L., 4,709,707, Cl. 131-276.000.
International Shoe Machine Corporation: *See*—
Walega, William, 4,709,433, Cl. 12-12.500.
International Teldata Corporation: *See*—
Oliver, Stewart W.; and Cosgrove, John, 4,710,919, Cl. 370-96.000.
InterNorth, Inc.: *See*—
White, Geoffrey T., 4,709,750, Cl. 165-10.000.
Interstate Brands Corporation: *See*—
Vanasse, Robert W., 4,709,851, Cl. 229-87.00B.
Iovine, Carmine P.: *See*—
Tokumoto, Minoru; Takagi, Motoyuki; Shitaoka, Shizuo; Gold, Samuel; and Iovine, Carmine P., 4,710,526, Cl. 524-5.000.
Ireland, David B.: *See*—
Cartmell, Robert L.; Daugherty, Charles W.; and Ireland, David B., 4,710,175, Cl. 604-177.000.
Irie, Shoji: *See*—
Maegawa, Harumi; Takai, Sakan; Sukeda, Toshiaki; Irie, Shoji; and Kobata, Shoichi, 4,710,895, Cl. 365-2.000.
Isaberg AB: *See*—
Westerlund, Bengt, 4,709,842, Cl. 227-120.000.
Ishida, Shiro, to Isuzu Motors Limited. Combustion chamber for an internal-combustion engine. 4,709,672, Cl. 123-256.000.
Ishidoh, Takanobu; and Kondoh, Yoshiyuki, to Sony Corporation. Digital signal transmitting system. 4,710,921, Cl. 370-110.100.
Ishii, Akira: *See*—
Matsuyama, Shigeru; Kanazaki, Mikio; Aoki, Norio; and Ishii, Akira, 4,709,993, Cl. 350-339.00F.
Tanaka, Ryuichi; and Ishii, Akira, 4,709,968, Cl. 303-6.00C.
Ishikawa, Tadashi; Matsuo, Kazuhiro; and Hoshi, Akimitsu, to Canon Kabushiki Kaisha. Sorting apparatus. 4,709,915, Cl. 271-288.000.
Ishioka, Hidenori: *See*—
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
Ishitani, Tohru; Todokoro, Hideo; Kawanami, Yoshimi; and Tamura, Hifumi, to Hitachi, Ltd. Ion microbeam apparatus. 4,710,632, Cl. 250-396.00R.
Isono, Kazuaki: *See*—
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
Isover Saint-Gobain: *See*—
Fugier, Roger; de Goys de Mezerac, Charles; Joachim, Jacky; and Decagny, Michel, 4,710,406, Cl. 427-389.800.
Isuzu Motors Limited: *See*—
Ishida, Shiro, 4,709,672, Cl. 123-256.000.
Itaya, Hiroshi; and Saito, Goro, to Anritsu Corporation. Heterodyne type signal-measuring method and a measuring apparatus including automatic detuning correction means. 4,710,702, Cl. 324-79.00R.
Itek Corporation: *See*—
Aufiero, James M., 4,710,966, Cl. 382-69.000.
Itezono, Toshiyuki, to Oki Electric Industry Co., Ltd. Facsimile system. 4,710,951, Cl. 379-100.000.
Ito, Isamu: *See*—
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.
Ito, Kiyonobu: *See*—
Nakamura, Kazuharu; Matsumoto, Motoki; Kondo, Akinobu; and Ito, Kiyonobu, 4,710,125, Cl. 431-22.000.
Itoh, Atsushi: *See*—
Murakami, Tokumichi; Itoh, Atsushi; Asai, Kohtaro; Kamizawa, Koh; and Nishida, Masami, 4,710,812, Cl. 358-136.000.

Itoh, Haruo, to Fuji Photo Film Co., Ltd. Tracking system for rotary magnetic recording medium using weighted sampled track values. 4,710,832, Cl. 360-10.200.

Itsuki, Fumiaki: *See*—
Nakama, Katsuhiko; Ninomiya, Hiroshi; Michishige, Toru; and Itsuki, Fumiaki, 4,709,976, Cl. 439-350.000.

ITT Gilfillan, a division of ITT Corporation: *See*—
Sterns, William G., 4,710,734, Cl. 333-101.000.

ITT Industries, Inc.: *See*—
Stahl, Torvald, 4,710,658, Cl. 310-71.000.

Ivac Corporation: *See*—
Butterfield, Robert D., 4,710,163, Cl. 604-65.000.

Iwabori, Tomio: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Iwai, Itsuo: *See*—
Ichihara, Eiichi; and Iwai, Itsuo, 4,709,667, Cl. 123-90.340.

Iwai, Shinichi; and Uno, Sakae, to International Business Machines Corporation. Digital display system with color lookup table. 4,710,806, Cl. 358-81.000.

Iwamoto, Joji: *See*—
Shirasu, Hiroshi; Shimeno, Kazuhiro; and Iwamoto, Joji, 4,710,604, Cl. 219-121.0LU.

Iwasaki, Tadayoshi; Ariga, Keiki; and Sato, Makoto, to Nippon Sanso Kabushiki Kaisha. Method and apparatus for determinating a vacuum degree within a flexible vacuum package. 4,709,578, Cl. 73-49.300.

Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, to Nippondenso Co., Ltd. Volume controlling device for variable volume pump. 4,710,106, Cl. 417-213.000.

Iyer, Srinivasa L., to Stress Steel Co., Inc. Method for making a prestressed composite structure and structure made thereby. 4,709,456, Cl. 29-155.00R.

Iyoda, Motomi, to Toyota Jidoshi Kabushiki Kaisha. Apparatus and a method for controlling wiper. 4,710,878, Cl. 364-424.000.

J. M. Voith GmbH: *See*—
Henrich, Hans-Otto; and Rienecker, Reimund, 4,710,287, Cl. 209-270.000.

Jabarin, Saleh A.: *See*—
Balduff, Dennis C.; and Jabarin, Saleh A., 4,709,808, Cl. 206-158.000.

Jackel, Janet L., to Bell Communications Research, Inc. Mach-Zehnder integrated optical modulator. 4,709,978, Cl. 350-96.140.

Jacklich, John; and Mikula, George, to Jacklich, John. High pressure syringe with pressure indicator. 4,710,172, Cl. 604-118.000.

Jackson, Robert L., Jr.: *See*—
Hoogenboom, Leo; Jackson, Robert L., Jr.; Kraft, Russell P.; and Offt, Alan M., 4,710,808, Cl. 358-107.000.

Jacobi, Manfred: *See*—
Lechtken, Peter; Buethe, Ingolf; Jacobi, Manfred; and Trimborn, Werner, 4,710,523, Cl. 522-14.000.

Jacobson, Bernard, to Boston Biomedical Research Institute. Cell proliferation inhibitor and method of preparation. 4,710,462, Cl. 435-68.000.

Jacoby, John E.; Yu, Ho; and Ramser, Robert A., to Aluminum Company of America. Direct chill casting of aluminum-lithium alloys. 4,709,740, Cl. 164-5.000.

Jager, Stewart C.: *See*—
Mills, Russell C.; and Jager, Stewart C., 4,709,929, Cl. 273-402.000.

Jahn, Herbert; and Waedt, Gunter, to Siemens Aktiengesellschaft. Tower design for high-voltage systems. 4,710,850, Cl. 361-333.000.

Jahnke, Andreas, to Siemens Aktiengesellschaft. Apparatus generating a magnetic field for a particle accelerator. 4,710,722, Cl. 328-234.000.

Jahnke, Andreas, to Siemens Aktiengesellschaft. Magnetic thin-film head for a recording medium that can be magnetized vertically. 4,710,838, Cl. 360-125.000.

Jaillet, Georges: *See*—
Jaillet, Jeannine; and Jaillet, Georges, 4,709,827, Cl. 220-4.00A.

Jaillet, Jeannine; and Jaillet, Georges. Home container. 4,709,827, Cl. 220-4.00A.

Jaitly, Kapil D.: *See*—
Hofman, Petrus S.; Hall, David W. R.; and Jaitly, Kapil D., 4,710,571, Cl. 544-216.000.

Jakobec, Franz: *See*—
Brand, Wilhelm; Vanek, Vaclav; and Jakobec, Franz, 4,710,834, Cl. 360-105.000.

Jakobs, Ewald: *See*—
Altmeyer, Werner; Jakobs, Ewald; and Meier, Friedrich, 4,710,078, Cl. 409-233.000.

James Howden & Company Limited: *See*—
Jamieson, Peter M., 4,710,101, Cl. 416-32.000.

James, John: *See*—
Wu, Joseph C.; Law, Yee-Shing; and James, John, 4,710,970, Cl. 455-113.000.

Jamieson, Peter M., to James Howden & Company Limited. Wind turbine. 4,710,101, Cl. 416-32.000.

Janiaud, Denis: *See*—
Fima, Henri; and Janiaud, Denis, 4,710,668, Cl. 310-323.000.

Japan as represented by Director-General, Agency of Industrial Science & Technology: *See*—
Doi, Yoshihiko; Kuroishi, Nobuhito; Ochi, Shigeki; and Uenishi, Noboru, 4,710,345, Cl. 419-28.000.

Japan Automatic Transmission Co., Ltd.: *See*—
Boda, Keiji; Waki, Kouichirou; and Yanagisawa, Keizo, 4,709,596, Cl. 74-868.000.

Japan Tobacco & Salt Public Corporation, The: *See*—
Hirose, Ichiro; and Sagawa, Takayoshi, 4,709,711, Cl. 131-336.000.
Kagawa, Kenichi, 4,709,708, Cl. 131-302.000.

Jaynes, Mark S.: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Jenkins, Stuart M.; Spencer, Michael S.; and Mayfield, Ross, to De La Rue Systems Limited. Sheet dispensing apparatus. 4,709,820, Cl. 209-534.000.

Jenkins, William R.: *See*—
Horn, Charles, deceased; and Jenkins, William R., 4,709,574, Cl. 72-405.000.

Jeol Ltd.: *See*—
Sawaragi, Hiroshi, 4,710,639, Cl. 250-492.200.

Jeschke, Peter: *See*—
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, 4,710,480, Cl. 501-95.000.

Jessick, James, to Future Fire Suppression, Inc. Self-activating fire extinguisher. 4,709,763, Cl. 169-26.000.

Jeumont-Schneider Corporation: *See*—
Camus, Etienne, 4,710,721, Cl. 328-109.000.

Jidosha Kiki Co., Ltd.: *See*—
Emori, Yasuyoshi; and Nomura, Ikuo, 4,709,591, Cl. 74-422.000.

Jira, Reinhard; and Ottlinger, Ralph, to Wacker Chemie GmbH. Process for stabilizing organopolysiloxanes. 4,710,558, Cl. 528-14.000.

Joachim, Jacky: *See*—
Fugier, Roger; de Goys de Mezerac, Charles; Joachim, Jacky; and Decagny, Michel, 4,710,406, Cl. 427-389.800.

Job, Robert C., to Shell Oil Company. Olefin polymerization catalyst component. 4,710,482, Cl. 502-127.000.

Johann Wolf Gesellschaft m.b.H. KG: *See*—
Wolf, Johann, 4,710,083, Cl. 411-466.000.

Johanndeiter, Martin H.: *See*—
Warmuth, Otto L.; Johanndeiter, Martin H.; and Raven, Johannes G., 4,710,802, Cl. 358-25.000.

Johnson, David A. Safety device including chamber probe. 4,709,496, Cl. 42-70.110.

Johnson, George C.: *See*—
Cubit, Harry T.; and Johnson, George C., 4,709,888, Cl. 248-73.000.

Johnson, Gerald W. Fat collection and injection process into same body. 4,710,162, Cl. 604-51.000.

Johnson, Gerald W. Lipoject needle. 4,710,180, Cl. 604-239.000.

Johnson, Henry F.: *See*—
Ewbank, Michael E.; and Johnson, Henry F., 4,709,665, Cl. 122-510.000.

Johnson, Lee K.: *See*—
Johnson, Lee R; and Johnson, Lee K., 4,709,829, Cl. 220-90.200.

Johnson, Lee R; and Johnson, Lee K. SAN-I-CAN (a beverage container incorporating its own straw). 4,709,829, Cl. 220-90.200.

Johnson, Mack E.: *See*—
Price, Macy J.; Price, Macy J., Jr.; and Johnson, Mack E., 4,709,815, Cl. 206-387.000.

Johnson, Malcolm L.: *See*—
Heyn, Lynn E.; Johnson, Malcolm L.; and Fischer, Danial O., 4,709,419, Cl. 2-46.000.

Johnson, Richard A., to C & K Systems, Inc. Fault detecting intrusion detection device. 4,710,750, Cl. 340-522.000.

Johnson Service Company: *See*—
Bly, Tom C., 4,709,757, Cl. 165-173.000.
Gish, Larry D., 4,709,721, Cl. 137-437.000.

Johnston, James H.; Hermann, George D.; and Atagi, Tanya A., to Fogarty, Thomas J. Heatable dilation catheter. 4,709,698, Cl. 128-303.120.

Jonergin, Inc.: *See*—
Kwiatek, Alfred; and Schwartz, Jack W., 4,710,191, Cl. 604-897.000.

Jones, Christopher R.; and Jones, Lee S., to Templex, Inc. Waste fabric and line collection box for a sewing machine. 4,709,645, Cl. 112-282.000.

Jones, Don C.: *See*—
Kelly, John E.; Jones, Don C.; Tuck, Frederick R.; Zimmermann, William A.; and Clark, Kenneth R., 4,710,031, Cl. 356-440.000.

Jones, Lee S.: *See*—
Jones, Christopher R.; and Jones, Lee S., 4,709,645, Cl. 112-282.000.

Jones, William G.: *See*—
Pierson, Karl B.; Mooney, Thomas E.; and Jones, William G., 4,709,901, Cl. 251-58.000.

Jonsson, Karl-Erik A. Debarking tool and arm combination. 4,709,737, Cl. 144-241.000.

Jordan, Barry J., to Jordon Instruments (Derby) Limited. Fault detecting apparatus. 4,710,628, Cl. 250-341.000.

Jorder, Kurt: *See*—
Fottinger, Walter; and Jorder, Kurt, 4,709,490, Cl. 36-44.000.

Jordon Instruments (Derby) Limited: *See*—
Jordan, Barry J., 4,710,628, Cl. 250-341.000.

Jorgensen, Robert J., to Union Carbide Corporation. Process for the production of a sticky polymer. 4,710,538, Cl. 525-53.000.

Jorke, Helmut: *See*—
Dambkes, Heinrich; Herzog, Hans-J.; and Jorke, Helmut, 4,710,788, Cl. 357-22.000.

Joseph, Gerald; and Berta, Joseph. Stabilizer device for automobile suspension systems. 4,709,908, Cl. 267-140.400.

Jost, Robert M.: *See*—
Malone, Gilbert R.; Skursha, Susan K.; and Jost, Robert M., 4,710,474, Cl. 436-60.000.

Jouanin, Pierre. Wooden modular furniture. 4,709,640, Cl. 108-91.000.

Junemann, Gitta; Hirsch, Werner; and Weiss, Arno, to B.A.T. Cigaretten-Fabriken GmbH. Process for the moistening of comminuted smoking materials. 4,709,709, Cl. 131-306.000.

Junge, Bodo: *See*—
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, 4,710,491, Cl. 514-42.000.

Junghans, Ewald: *See*—
Tittizer, Gabriel; Junghans, Ewald; Bestenreiner, Georg; and Dahm, Christian, 4,710,034, Cl. 384-110.000.

Jungheinrich Unternehmensverwaltung KG: *See*—
David, Bernd; and Klingberg, Alfred, 4,709,786, Cl. 187-9.00E.

Junker, Erwin. Method and apparatus for high speed profile grinding of rotation symmetrical workpieces. 4,709,508, Cl. 51-105.00R.

Junkosha Co., Ltd.: *See*—
Tanaka, Satoshi; and Imaizumi, Haruo, 4,710,353, Cl. 422-68.000.

Juridical Foundation The Chemo-Sero-Therapeutic Research Institute: *See*—
Ohtomo, Nobuya; Mizuno, Kyosuke; Hamada, Fukusaburo; and Mizokami, Hiroshi, 4,710,378, Cl. 424-89.000.

Juwedor GmbH: *See*—
Kull, Herbert, 4,710,276, Cl. 204-9.000.

Kabushiki Kaisha Daikin Seisakusho: *See*—
Uenohara, Norihisa, 4,709,796, Cl. 192-106.100.

Kabushiki Kaisha Kenwood: *See*—
Matsui, Toshiyuki, 4,710,962, Cl. 381-102.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Maeda, Fujio, 4,709,594, Cl. 74-753.000.

Kabushiki Kaisha Machida Seisakusho: *See*—
Chikama, Toshio, 4,710,807, Cl. 358-98.000.

Kabushiki Kaisha Sato: *See*—
Kashiwaba, Tadao, 4,709,868, Cl. 242-56.00R.

Kabushiki Kaisha Showa Seisakusho: *See*—
Suzuki, Hideo; Okamoto, Kunihide; Hayashi, Yasuyuki; and Aiba, Mitsuru, 4,709,934, Cl. 280-6.00R.

Kabushiki Kaisha Toshiba: *See*—
Banno, Haruhiko; and Yatagai, Shigeo, 4,710,771, Cl. 340-811.000.
Enokizono, Takatoshi, 4,710,869, Cl. 364-200.000.
Harada, Yutaka, 4,709,788, Cl. 187-124.000.
Ide, Yuji, 4,710,804, Cl. 358-48.000.
Ikeya, Hirotoshi; and Higashi, Michiya, 4,710,796, Cl. 357-72.000.
Kanda, Hiroyuki, 4,710,687, Cl. 318-561.000.
Komatsu, Shigeru, 4,710,241, Cl. 437-162.000.
Koshino, Yutaka; Akiyama, Tatsuo; and Baba, Yoshiro, 4,710,794, Cl. 357-49.000.
Kubo, Masahiro, 4,710,111, Cl. 418-63.000.
Masuoka, Fujio; and Ochii, Kiyofumi, 4,710,897, Cl. 365-182.000.
Matsuura, Toshihiro, 4,710,099, Cl. 415-199.500.
Nagumo, Masahide, 4,710,923, Cl. 371-2.000.
Oana, Yasuhisa, 4,709,990, Cl. 350-339.00F.
Sumi, Masahiko, 4,710,898, Cl. 365-189.000.
Tsuchiya, Akira, 4,710,860, Cl. 363-28.000.
Uchida, Yukimasa, 4,710,905, Cl. 365-229.000.
Waatanabe, Junji, 4,710,016, Cl. 355-4.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Kawai, Katsunori; Kobayashi, Hisao; Deguchi, Hiroyuki; and Sugizono, Shuichi, 4,709,555, Cl. 62-228.300.

Kabushiki Kaisha Tsuchiya Seisakusho: *See*—
Suzuki, Mitsutoshi; Morita, Yoshitaka; Okada, Masami; and Shimohara, Jun, 4,710,297, Cl. 210-493.200.

Kabushiki Kaisya Advance Kaihatsu Kenkyujo: *See*—
Kawai, Yasuo; and Shimohashi, Hirotaka, 4,710,379, Cl. 424-93.000.

Kadlubowski, Joseph C.: *See*—
Cors, Craig M.; and Kadlubowski, Joseph C., 4,710,742, Cl. 337-323.000.

Kadonoff, Mark B.: *See*—
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., 4,710,020, Cl. 356-1.000.

Kadowaki, Hitoshi: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Kadunce, Leo, to Steeltin Can Corporation. Method and machine for convolute or spiral winding of composite materials. 4,710,252, Cl. 156-195.000.

Kagabu, Shinzo: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Kagabu, Shinzo; Sakawa, Shinji; and Moriya, Koichi, 4,710,518, Cl. 514-624.000.

Kagawa, Kenichi, to Japan Tobacco & Salt Public Corporation, The. Control system for humidity controller of tobacco leaves. 4,709,708, Cl. 131-302.000.

Kageler, Peter; Bostelmann, Rudolf; and Buhrmester, Olaf, to Korber AG. Method and apparatus for pneumatically transporting filter rod sections and the like. 4,710,066, Cl. 406-29.000.

Kahil, John E.: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Kai, Yasuaki; Sagawa, Takatoshi; and Tabata, Hiroshi, to Nissan Motor Co., Ltd. Directional light-shield board. 4,709,988, Cl. 350-276.00R.

Kaiser, Gunther; and Krauter, Immanuel, to Robert Bosch GmbH. Method of stabilizing current flow through an automotive-type ignition coil. 4,709,684, Cl. 123-644.000.

Kaiser, Hasso, to DEGUSSA Aktiengesellschaft. Process for introducing bath components into electrolytic and currentless baths. 4,710,224, Cl. 106-1.230.

Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, to Shimizu Construction Co., Ltd. Climbing formwork apparatus for concrete placing. 4,709,899, Cl. 249-20.000.

Kalinowski, Robert E.: *See*—
Graiver, Daniel; and Kalinowski, Robert E., 4,710,405, Cl. 427-387.000.

Kamarainen, Jorma, to Valmet Oy. Water vessels of the floating-deck type. 4,710,060, Cl. 405-166.000.

Kamizawa, Koh: *See*—
Murakami, Tokumichi; Itoh, Atsushi; Asai, Kohtaro; Kamizawa, Koh; and Nishida, Masami, 4,710,812, Cl. 358-136.000.

Kamoshita, Katsuzo: *See*—
Takahashi, Junya; Kato, Toshiro; and Kamoshita, Katsuzo, 4,710,514, Cl. 514-485.000.

Kamp, Ewald A.: *See*—
Borchardt, Michael G.; Dorsey, Robert T.; and Kamp, Ewald A., 4,710,968, Cl. 383-63.000.

Kampe, Wolfgang: *See*—
Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, 4,710,510, Cl. 514-394.000.

Kamyr AB: *See*—
Nilsson, Bengt H., 4,710,268, Cl. 162-23.000.

Kanayama, Ikuo: *See*—
Hayashi, Toshihide; Yamakami, Osamu; and Kanayama, Ikuo, 4,710,972, Cl. 455-179.000.

Kanazaki, Mikio: *See*—
Matsuyama, Shigeru; Kanazaki, Mikio; Aoki, Norio; and Ishii, Akira, 4,709,993, Cl. 350-339.00F.

Kanbe, Junichiro; and Okada, Shinjiro, to Canon Kabushiki Kaisha. Liquid crystal device using ferroelectric liquid crystal twisted in two stable states. 4,709,994, Cl. 350-350.00S.

Kanbe, Junichiro: *See*—
Kuribayashi, Masaki; Nakazawa, Toshihiko; and Kanbe, Junichiro, 4,709,995, Cl. 350-350.00S.

Kanda, Hiroyuki, to Kabushiki Kaisha Toshiba. Seek operation control apparatus. 4,710,687, Cl. 318-561.000.

Kaneaki, Tetsuhiko: *See*—
Takagi, Yoshiyuki; and Kaneaki, Tetsuhiko, 4,709,611, Cl. 84-1.220.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Tonoki, Satoshi; Tsunemi, Hidenari; Nishimura, Asaichi; and Abe, Kunihisa, 4,710,420, Cl. 428-212.000.

Kaneko, Toshio: *See*—
Takeda, Fuchio; Matsushiro, Hiroyuki; Kobayashi, Kazuo; and Kaneko, Toshio, 4,710,015, Cl. 355-3.0DD.

Kanies, Kerry R., to Oilgear Company, The. Swashblock lubrication in axial piston fluid displacement devices. 4,710,107, Cl. 417-269.000.

Kanner, Martin. Anti-ripple circuit. 4,710,861, Cl. 363-46.000.

Kansai Paint Co., Ltd.: *See*—
Tominaga, Akira; and Nishida, Reiziro, 4,710,561, Cl. 528-111.000.

Kanzaki Paper Manufacturing Co., Ltd.: *See*—
Osaki, Shigeyoshi; and Fujii, Yoshihiko, 4,710,700, Cl. 324-58.50A.

Kao Corporation: *See*—
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.

Kappeler, Otmar: *See*—
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, 4,710,814, Cl. 358-143.000.

Kapur, Rajan N.; and Szurkowski, Edward S., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Window border generation in a bitmapped graphics workstation. 4,710,761, Cl. 340-721.000.

Karmazin, Jan E. L. Device for fastening a closed casing. 4,710,051, Cl. 403-227.000.

Karnesky, Richard A.: *See*—
Christiansen, David W.; and Karnesky, Richard A., 4,710,343, Cl. 376-414.000.

Kasai, Masuo: *See*—
Tsuyoshi, Toshiaki; Yonezawa, Seiji; Kasai, Masuo; and Uno, Motoo, 4,710,909, Cl. 369-46.000.

Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, to Tsukishima Kikai Co., Ltd.; and Sumitomo Metal Industries, Ltd. Process for distillation-crystallization of zinc carbonate. 4,710,215, Cl. 62-532.000.

Kasday, Leonard R., to American Telephone and Telegraph Company, AT&T Information Systems Inc. Photoelastic touch-sensitive screen. 4,710,760, Cl. 340-712.000.

Kashiwaba, Tadao, to Kabushiki Kaisha Sato. Setting and winding mechanism for tape-like laminate in laminator. 4,709,868, Cl. 242-56.00R.

Katayama, Hideaki: *See*—
Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, 4,710,255, Cl. 156-361.000.

Kato, Hisatoyo: *See*—
Takahashi, Kenji; Umemoto, Chiyuki; and Kato, Hisatoyo, 4,710,626, Cl. 250-327.200.

Kato, Kichiro, to Toyota Jidosha Kabushiki Kaisha. Device for controlling the pressure in the bearings of a roots blower supercharger. 4,709,682, Cl. 123-559.000.

Kato, Masakazu, to Alps Electric Co., Ltd. Method of fabricating print head for thermal printer. 4,710,263, Cl. 156-637.000.

Kato, Mitsutaka: *See*—
Hirano, Masao; Kato, Mitsutaka; Yasuda, Hirohiko; and Hinoda, Seisuke, 4,710,033, Cl. 374-161.000.

Kato, Takashi: *See*—
Uryu, Toshiyuki; and Kato, Takashi, 4,710,547, Cl. 525-437.000.

Kato, Toshiro: *See*—
Takahashi, Junya; Kato, Toshiro; and Kamoshita, Katsuzo, 4,710,514, Cl. 514-485.000.

Katoh, Kinya, to Nippon Kogaku K. K. Projection type exposing apparatus. 4,710,029, Cl. 356-401.000.

Katoh, Tadayoshi: *See*—
Shimoda, Kaneyasu; Katoh, Tadayoshi; and Ageno, Yuzo, 4,710,746, Cl. 340-347.0DD.

Katsumata, Ryoichi; Ozaki, Akio; Oka, Tetsuo; and Furuya, Akira, to Kyowa Hakko Kogyo Co., Ltd. Novel vector plasmids. 4,710,471, Cl. 435-253.000.

Kauffman, Marc W., to General Instrument Corporation. Cable television system with two-way telephone communication path. 4,710,955, Cl. 380-10.000.

Kaufmann, Felix; and Schillinger, Daniel, to BBC Brown, Boveri & Company, Limited. Programming device for a stored-program controller. 4,710,863, Cl. 364-146.000.

Kaultronics, Inc.. *See*—
Halverson, Ross, 4,710,777, Cl. 343-840.000.

Kawabata, Osamu, to Fuji Electric Company, Ltd. Noise removal circuit for use in a partial discharge measuring device of a high voltage apparatus. 4,710,705, Cl. 324-102.000.

Kawabata, Takao: *See*—
Mizohata, Fumio; and Kawabata, Takao, 4,710,696, Cl. 323-223.000.

Kawaguchi, Akiko: *See*—
Takasuka, Yutaka; Mohri, Kunihiko; and Kawaguchi, Akiko, 4,710,375, Cl. 424-69.000.

Kawaguchi, Katsuji: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Kawai, Hiroyuki: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.

Kawai, Katsunori; Kobayashi, Hisao; Deguchi, Hiroyuki; and Sugizono, Shuichi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Variable delivery refrigerant compressor of double-acting swash plate type. 4,709,555, Cl. 62-228.300.

Kawai, Makoto: *See*—
Yagi, Shizuo; Kawai, Makoto; and Yamamoto, Yorihisa, 4,709,678, Cl. 123-425.000.

Kawai, Yasuo; and Shimohashi, Hirotaka, to Kabushiki Kaisya Advance Kaihatsu Kenkyujo. Intestinal microflora-improving agent. 4,710,379, Cl. 424-93.000.

Kawamoto, Masashi: *See*—
Yamada, Fumiya; Matsuki, Seiichiro; Kawamura, Masahiko; and Kawamoto, Masashi, 4,710,835, Cl. 360-106.000.

Kawamura, Masahiko: *See*—
Yamada, Fumiya; Matsuki, Seiichiro; Kawamura, Masahiko; and Kawamoto, Masashi, 4,710,835, Cl. 360-106.000.

Kawanami, Yoshimi: *See*—
Ishitani, Tohru; Todokoro, Hideo; Kawanami, Yoshimi; and Tamura, Hifumi, 4,710,632, Cl. 250-396.00R.

Kawasaki, Katsuhiro, to Hitachi, Ltd. Electron beam lithography. 4,710,640, Cl. 250-492.200.

Kawasaki Steel Corporation: *See*—
Tosaka, Akio; Hashiguchi, Koichi; Morita, Masahiko; and Okano, Shinobu, 4,709,557, Cl. 62-373.000.

Kawauchi, Masataka: *See*—
Saiki, Eisaku; and Kawauchi, Masataka, 4,709,911, Cl. 271-10.000.

Kayser, Michael: *See*—
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, 4,710,501, Cl. 514-256.000.

Kazaoka, Kenichi; and Okazaki, Hiroshi, to . isin Seiki Kabushika Kaisha. Seat reclining apparatus. 4,709,965, Cl. 297-366.000.

Kea, Sandra; and Walker, Charles E., to Nebraska Department of Economic Development, State of Nebraska. Separation and purification of sugar esters synthesized from both aqueous and nonaqueous systems. 4,710,567, Cl. 536-119.000.

Keady, Peter; and Magennis, Thomas P., to Viking Container Company. Container and protective insert for shock sensitive devices. 4,709,817, Cl. 206-523.000.

Keen, Nickey D., to General Motors Corporation. Spring retainer for encapsulated semiconductor device. 4,710,852, Cl. 361-386.000.

Keeton, Richard L. Method for preserving fishing nets. 4,710,407, Cl. 427-389.900.

Kegel, Kurt: *See*—
Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, 4,710,607, Cl. 219-121.00P.

Keller, Thomas J.: *See*—
Hennon, Erin D.; and Keller, Thomas J., 4,710,038, Cl. 384-569.000.

Kellermann, Guenter: *See*—
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.

Kelly, John E.; Jones, Don C.; Tuck, Frederick R.; Zimmermann, William A.; and Clark, Kenneth R., to Lancraft, Inc. Microtiter plate reader. 4,710,031, Cl. 356-440.000.

Kelly, Michael A., to Kevex Corporation. Charged particle energy analyzer based upon isentropic containment. 4,710,625, Cl. 250-305.000.

Kelly, Robert J.; and Kelly, Tadhg, to Communication Devices, Inc. Modem use monitor. 4,710,929, Cl. 371-22.000.

Kelly, Stephen M.: *See*—
Schad, Hans P.; and Kelly, Stephen M., 4,710,315, Cl. 252-299.630.

Kelly, Tadhg: *See*—
Kelly, Robert J.; and Kelly, Tadhg, 4,710,929, Cl. 371-22.000.

Kelman, Charles D. Intraocular lens with optic of expandable hydrophilic material. 4,710,194, Cl. 623-6.000.

Kendall Company, The: *See*—
Lukasiewicz, Mark, 4,709,704, Cl. 128-644.000.
Rosenberg, Helmut W. G., 4,710,171, Cl. 604-117.000.

Kennedy, Gary D.; and Maher, Joseph G., to Kentec, Inc. Picture frame fastener. 4,709,494, Cl. 40-152.000.

Kentec, Inc.: *See*—
Kennedy, Gary D.; and Maher, Joseph G., 4,709,494, Cl. 40-152.000.

Keren, Hanan; and Freundlich, David, to Elscint Ltd. Slice orientation selection arrangement. 4,710,716, Cl. 324-309.000.

Kevex Corporation: *See*—
Kelly, Michael A., 4,710,625, Cl. 250-305.000.

Key, James D. Belt for arthroscopic treatment of an injured leg supported by a surgeon. 4,709,693, Cl. 128-80.00G.

Kholin, Boris G., to Sumsky Filial Kharkovskogo Politekhnicheskogo Instituta. Ball throwing device. 4,709,685, Cl. 124-7.000.

Khoury, Issam A.: *See*—
Harley, A. Dale; Duquette, Lawrence G.; Khoury, Issam A.; and Kohatsu, Iwao, 4,710,227, Cl. 106-193.00R.

Kick, Helmut: *See*—
Sapper, Rainer; and Kick, Helmut, 4,710,213, Cl. 62-28.000.

Kidani, Yoshinori; and Noji, Masahide. Cytostatic platinum organic complexes. 4,710,577, Cl. 556-137.000.

Kido, Kunio: *See*—
Tanaka, Shinsaku; and Kido, Kunio, 4,709,871, Cl. 242-68.300.

Kidwell, Charles E.: *See*—
Baity, Donald N.; Schwandt, Gregory J.; and Kidwell, Charles E., 4,710,602, Cl. 200-315.000.

Kikkoman Corporation: *See*—
Akao, Takeshi; and Furukawa, Toshio, 4,709,487, Cl. 34-10.000.

Kikuchi, Sanae: *See*—
Shimizu, Keiichi; Kikuchi, Sanae; and Nakano, Hitoshi, 4,709,931, Cl. 277-153.000.

Kikut, Botho: *See*—
Zimmer, Ernst; and Kikut, Botho, 4,710,093, Cl. 414-730.000.

Kilfa Limited: *See*—
Loveridge, Ronald, 4,710,023, Cl. 356-124.000.

Kilgore, Lee A.; and McKee, Bobby D., to Westinghouse Electric Corp. Homopolar dynamoelectric machine with self-compensating current collector. 4,710,665, Cl. 310-219.000.

Kim, Choung Un.; and Misco, Peter F., Jr., to Bristol-Myers Company. Carbapenem antibiotics. 4,710,568, Cl. 540-350.000.

Kim, Dongsung R.; and Kronies, Reinhard K., to Unisys Corporation. Parity detection system for wide bus circuitry. 4,710,935, Cl. 371-49.000.

Kimbara, Kohji, to NEC Corporation. Multilayer wiring substrate with engineering change pads. 4,710,592, Cl. 174-68.500.

Kimberly-Clark Corporation: *See*—
Boland, Leona G.; Stevens, Robert A.; Wilson, John C.; and Zehner, Georgia L., 4,710,187, Cl. 604-385.00A.
Sneyd, James C., Jr.; Harris, Robert D.; and Latimer, Margaret G., 4,710,185, Cl. 604-372.000.

Kimberly-Clarke Corporation: *See*—
Heyn, Lynn E.; Johnson, Malcolm L.; and Fischer, Danial O., 4,709,419, Cl. 2-46.000.

Kimura, Kiyoshi, to Alps Electric Co., Ltd. Coordinate input device. 4,710,595, Cl. 178-18.000.

Kimura, Takashi: *See*—
Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Maehara, Yasuhiro; and Yasumoto, Kunio, 4,709,572, Cl. 72-366.000.

Kinashi, Shoji: *See*—
Murakami, Saburo; Kinashi, Shoji; and Ego, Toyokazu, 4,710,333, Cl. 264-73.000.

Kinki Insatsu Kabushiki Kaisha: *See*—
Shimada, Katsuyuki, 4,709,811, Cl. 206-254.000.

Kinnunen, Martti I., to Huyck Corporation. Fourteen harness dual layer weave. 4,709,732, Cl. 139-383.00A.

Kirchhuebel, Rainer: *See*—
Spitznas, Manfred; Reiner, Josef; Veit, Wolfgang; and Kirchhuebel, Rainer, 4,710,000, Cl. 350-516.000.

Kirin Beer Kabushiki Kaisha: *See*—
Komano, Tohru; and Ohyma, Kanji, 4,710,461, Cl. 435-68.000.
Kirk, Alan R.; and Scherrer, Robert A., to Riker Laboratories, Inc. Substituted biphenyl derivatives. 4,710,515, Cl. 514-563.000.
Kirn, Jeffrey F.; and Connaughton, James M., Jr., to Conagra, Inc. Flavoring method for fried food products. 4,710,391, Cl. 426-289.000.
Kirsch, Warren B., to Ethyl Corporation. Removing or decreasing iron-caused yellow color in a solution. 4,710,306, Cl. 252-8.551.
Kirschenberg, Bruce H.; and Platt, Richard L. Thigh mounted lower back support belt. 4,709,692, Cl. 128-78.000.
Kirsten, Thomas P.: *See*—
Parkinson, James G.; and Kirsten, Thomas P., 4,709,966, Cl. 297-473.000.
Kishi, Hiroyoshi: *See*—
Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, 4,710,418, Cl. 428-192.000.
Kita, Yasushi; and Moroi, Shiro, to Central Glass Company, Limited. Method of producing electric cell anode using powdery active material. 4,710,335, Cl. 264-105.000.
Kitahara, Takeshi, to Fujitsu Limited. Loop transmission system having automatic loop configuration control means. 4,710,915, Cl. 370-16.000.
Kitazawa, Yoshihiro, to Dainippon Screen Mfg. Co., Ltd. Density conversion in image reproduction. 4,710,823, Cl. 358-280.000.
Kittler, Wilfred C.: *See*—
Ritchie, Ian T.; and Kittler, Wilfred C., 4,710,441, Cl. 430-62.000.
Klann, Horst. Assembly device for axle bearings and/or wheel flange hubs of motor vehicles. 4,709,459, Cl. 29-263.000.
Klatzka, Joseph H.: *See*—
Maass, Helmut; and Klatzka, Joseph H., 4,710,055, Cl. 404-112.000.
Klein, Frank H.: *See*—
Van Hout, James E.; and Klein, Frank H., 4,710,858, Cl. 362-95.000.
Klein, Max. Mica-polymer micro-bits composition and process. 4,710,520, Cl. 521-55.000.
Klein, Sigismund, to Siemens Aktiengesellschaft. Collimator for a radiation diagnostics apparatus. 4,710,947, Cl. 378-147.000.
Klingberg, Alfred: *See*—
David, Bernd; and Klingberg, Alfred, 4,709,786, Cl. 187-9.00E.
Klingen, Jurgen; and Zimmerman, Patrick G., to Minnesota Mining and Manufacturing Company. Pressure-sensitive adhesive tape containing hydrophobic silica. 4,710,536, Cl. 524-493.000.
Klingensmith, James D.: *See*—
Stemler, J. Robert; Klingensmith, James D.; Menzemer, Craig C.; Kulicki, John M.; and Theofanis, Nicholas D., 4,709,435, Cl. 14-73.000.
Klinker, Rolf: *See*—
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.
Klintenstedt, Kjell; Foldhazy, Zoltan; and Forsberg, Bjorn, to Alfa-Laval AB. Centrifugal separator. 4,710,160, Cl. 494-64.000.
Kloeber GmbH & Co.: *See*—
Steinmann, Joachim, 4,709,962, Cl. 297-301.000.
Klug, Horst; Mocker, Wolfgang; Schaeffler, George; and Speil, Walter, to INA Walzlager Schaeffler KG. Self-adjusting hydraulic valve tappet. 4,709,668, Cl. 123-90.550.
Klumpp, Walter, to Rheinmetall GmbH. Throwing device for firing incandescent bodies. 4,709,614, Cl. 89-1.350.
Knapp, Paul A. Valve apparatus for crankcase oil drainage. 4,709,722, Cl. 137-539.000.
Knaur, James A.: *See*—
Greene, Hugh W.; Holder, James D.; and Knaur, James A., 4,710,912, Cl. 369-218.000.
Kniep, Volkmar: *See*—
Illig, Egon; and Kniep, Volkmar, 4,709,912, Cl. 271-42.000.
Kniess, Donald L. Plumbing fitting for a multiple-line connection. 4,709,947, Cl. 285-150.000.
Knight, Joseph L. Pressure slip expansion joint. 4,709,524, Cl. 52-536.000.
Knight, Silsby H., to Hayes-Ivy Manufacturing Inc. Retractable pre-rinse unit with automatic shutoff. 4,709,715, Cl. 134-172.000.
Knipp, Randall S.; and Loyd, Lewis, to Hallmark Cards, Incorporated. Method and apparatus for producing deckled edge paper. 4,710,158, Cl. 493-328.000.
Knobloch, Osbert: *See*—
Henne, Heinrich; Patzelt, Norbert; Schneider, Lutz T.; Knobloch, Osbert; and Muller, Manfred, 4,709,864, Cl. 241-167.000.
Knoblock, Glenn A.; and Scolten, Brian L., to Steelcase Inc. Slip connector for weight actuated height adjustors. 4,709,894, Cl. 248-406.200.
Knoll, Frank: *See*—
Spinosa, Dominic J.; and Knoll, Frank, 4,709,818, Cl. 206-524.800.
Knowles, Terence J.; Ray, Francis M.; and Shewey, Charles E., to Zenith Electronics Corporation. High voltage electronic component test apparatus. 4,710,707, Cl. 324-158.00F.
Kobata, Shoichi: *See*—
Maegawa, Harumi; Takai, Sakan; Sukeda, Toshiaki; Irie, Shoji; and Kobata, Shoichi, 4,710,895, Cl. 365-2.000.
Kobayashi, Hisao: *See*—
Kawai, Katsunori; Kobayashi, Hisao; Deguchi, Hiroyuki; and Sugizono, Shuichi, 4,709,555, Cl. 62-228.300.
Kobayashi, Kazuo: *See*—
Takeda, Fuchio; Matsushiro, Hiroyuki; Kobayashi, Kazuo; and Kaneko, Toshio, 4,710,015, Cl. 355-3.0DD.
Kobayashi, Kazuyoshi: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yussa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.
Kobayashi, Kiyohiko, to Ricoh Company, Ltd. Image data masking device. 4,710,965, Cl. 382-41.000.
Kobayashi, Kozo; and Goto, Hideo, to Nakamichi Corporation. Operation prohibition device for an audio instrument. 4,710,907, Cl. 369-6.000.
Kobayashi, Shigeru: *See*—
Ichimaru, Yoshiro; Kobayashi, Shigeru; and Ohashi, Toshio, 4,709,751, Cl. 165-17.000.
Kobayashi, Takayuki: *See*—
Yoshimura, Toshiteru; Kobayashi, Takayuki; and Ono, Masayoshi, 4,709,943, Cl. 280-751.000.
Kobayashi, Takehiro: *See*—
Uetsuki, Haruo; Kobayashi, Takehiro; and Yamane, Hiroto, 4,710,689, Cl. 318-630.000.
Kobayashi, Tsuneo, to NEC Corporation. Distributed control type electronic switching system. 4,710,952, Cl. 379-269.000.
Koch, Christian. Diesel exhaust gas catalyst. 4,710,487, Cl. 502-303.000.
Kodaira, Takanori: *See*—
Namai, Akihiro; Egawa, Akira; and Kodaira, Takanori, 4,710,010, Cl. 354-400.000.
Koehler, Heinrich P.; and Dixon, John R., to Black & Decker Inc. Family of electric drills and two-speed gear box therefor. 4,710,071, Cl. 408-133.000.
Koek, Kevin C.: *See*—
LaBudde, Brian R.; and Koek, Kevin C., 4,709,972, Cl. 312-208.000.
Koelling, Alan L.; Murphy, William J.; and Mayer, Edward F., to Ricoh Systems, Inc. Gradient layer panchromatic photoreceptor. 4,710,442, Cl. 430-85.000.
Koester, Charles J.: *See*—
Donn, Anthony; and Koester, Charles J., 4,710,197, Cl. 623-6.000.
Koga, Toshio, to NEC Corporation. Predictive coding/decoding apparatus for video signal. 4,710,810, Cl. 358-133.000.
Kogan, David I.: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.
Kohashi, Toru; and Adachi, Motoyuki, to Yamato Scale Company, Limited. Device for correcting dynamic weight signal from conveyer weigher. 4,709,770, Cl. 177-50.000.
Kohatsu, Iwao: *See*—
Harley, A. Dale; Duquette, Lawrence G.; Khoury, Issam A.; and Kohatsu, Iwao, 4,710,227, Cl. 106-193.00R.
Kohn, Roger; and Shields, William K. M. Protective device. 4,709,695, Cl. 128-132.00R.
Kohno, Takanori, to Copal Company Limited. Control circuit for a programming shutter. 4,710,014, Cl. 354-427.000.
Koito Seisakusho Co., Ltd.: *See*—
Fuke, Akira; Tokita, Yasuhiro; and Masuda, Katsuhiko, 4,710,938, Cl. 372-56.000.
Kojima, Haruo; and Akasaki, Hidehiko, to Fujitsu Limited. Method for producing a package for a semiconductor device. 4,710,250, Cl. 156-89.000.
Kokusai Denshin Denwa Co., Ltd.: *See*—
Wakabayashi, Hiroharu; and Niiro, Yasuhiko, 4,710,976, Cl. 455-601.000.
Kolbenschmidt AG: *See*—
Mielke, Siegfried, 4,709,620, Cl. 92-187.000.
Koller, Franz, to Siemens Aktiengesellschaft. Device for assembling electrical components on a terminal carrier plate. 4,709,847, Cl. 228-49.100.
Komaki, Shozo: *See*—
Okamoto, Yoshiharu; Horikawa, Izumi; and Komaki, Shozo, 4,710,975, Cl. 455-276.000.
Komano, Tohru; and Ohyma, Kanji, to Kirin Beer Kabushiki Kaisha; and Marubeni Kabushiki Kaisha. Promoter derived from chloroplast DNA. 4,710,461, Cl. 435-68.000.
Komatsu Forklift Kabushiki Kaisha: *See*—
Ochiai, Toshio; Tsujimura, Akio; and Tsukiyasu, Hiroshi, 4,710,091, Cl. 414-623.000.
Komatsu, Shigeru, to Kabushiki Kaisha Toshiba. Method of making a bipolar semiconductor device. 4,710,241, Cl. 437-162.000.
Komeshima, Nobuyasu: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.
Komine, Tomio: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.
Komura, Osamu: *See*—
Sekiguchi, Yukio; Funakubo, Hiroyasu; Sakanoue, Hitoyuki; and Komura, Osamu, 4,709,844, Cl. 228-3.100.
Kondo, Akinobu: *See*—
Nakamura, Kazuharu; Matsumoto, Motoki; Kondo, Akinobu; and Ito, Kiyonobu, 4,710,125, Cl. 431-22.000.
Kondo, Kazuo: *See*—
Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, 4,709,714, Cl. 134-89.000.

Kondo, Kiyoshi: *See*—
Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, 4,709,714, Cl. 134-89.000.

Kondo, Tetsujiro, to Sony Corporation. Highly efficient coding apparatus for a digital video signal. 4,710,811, Cl. 358-135.000.

Kondo, Yutaka: *See*—
Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, 4,709,714, Cl. 134-89.000.

Kondoh, Yoshiyuki: *See*—
Ishidoh, Takanobu; and Kondoh, Yoshiyuki, 4,710,921, Cl. 370-110.100.

Konishi, Masahiro: *See*—
Aotsuka, Yasuo; Konishi, Masahiro; and Takahashi, Koji, 4,710,631, Cl. 250-354.100.

Konishiroku Photo Industry Co., Ltd.: *See*—
Funaki, Shinsuke; Akanabe, Yuichi; and Ikeda, Hiroaki, 4,710,779, Cl. 346-1.100.
Hirabayashi, Shigeto; Matsuzaka, Syoji; Ohya, Yukio; and Nonaka, Yoshiyuki, 4,710,453, Cl. 430-505.000.
Matsunawa, Masahiko, 4,710,822, Cl. 358-280.000.
Yamauchi, Yasuhisa; Asano, Masao; Anzai, Hideyuki; and Yasufuku, Yoshitaka, 4,710,427, Cl. 428-407.000.

Kono, Kunio: *See*—
Matsuda, Katsumi; and Kono, Kunio, 4,709,529, Cl. 53-207.000.

Kopp, Norbert: *See*—
Morell, Joseph; De Marchi, Jean-Louis; and Kopp, Norbert, 4,709,491, Cl. 36-121.000.

Korber AG: *See*—
Kageler, Peter; Bostelmann, Rudolf; and Buhrmester, Olaf, 4,710,066, Cl. 406-29.000.

Korea Advanced Institute of Science and Technology: *See*—
Gil, Kim Y.; and Sun, Lee C., 4,710,347, Cl. 420-94.000.

Korsunsky, Iosif, to AMP Incorporated. Low insertion force chip carrier connector with movable housing. 4,710,134, Cl. 439-264.000.

Kortschinski, Juri; Lat, Michael V.; Maurice, Claude G.; and Tickner, Derek C. Current-limiting surge arrester disconnector. 4,710,847, Cl. 361-125.000.

Koschinski, Ingo: *See*—
Reichert, Karl-Heinz; and Koschinski, Ingo, 4,710,546, Cl. 525-420.000.

Koshino, Yutaka; Akiyama, Tatsuo; and Baba, Yoshiro, to Kabushiki Kaisha Toshiba. Composite semiconductor device. 4,710,794, Cl. 357-49.000.

Kosterka, Donald W., to AGI Incorporated. Compact disc package and a method of making same. 4,709,812, Cl. 206-310.000.

Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., to Institut Gornogo Dela So An USSR. Annular air hammer apparatus for drilling wells. 4,709,768, Cl. 175-296.000.

Kozarich, John W.; and Rhoads, Robert E., to Yale University. Purification of the messenger RNA cap-binding protein. 4,710,566, Cl. 536-28.000.

Kraemer, Dieter; Siol, Werner; Markert, Gerhard; Suetterlin, Norbert; and Feil, Cornelia, to Rohm GmbH. Polymer particles and latices thereof for the immobilization of biologically active substances. 4,710,525, Cl. 523-201.000.

Krafft, Frederic B., to Entwistle Company, The. Method and apparatus for twisting filaments to form a cable. 4,709,542, Cl. 57-16.000.

Kraft, Russell P.: *See*—
Hoogenboom, Leo; Jackson, Robert L., Jr.; Kraft, Russell P.; and Offt, Alan M., 4,710,808, Cl. 358-107.000.

Kramer, Felix, to Elpatronic AG. Magazine for stacking sheet-metal members. 4,710,088, Cl. 414-113.000.

Kranbuehl, David E. Method of using a dielectric probe to monitor the characteristics of a medium. 4,710,550, Cl. 526-60.000.

Kransco Manufacturing, Inc.: *See*—
Harrod, Lawrence R., 4,709,958, Cl. 296-177.000.

Kraus, Charles E., to Excclermatic Inc. Fixed ratio traction roller transmission. 4,709,589, Cl. 74-206.000.

Kraus, Menahem A.; and Murphy, Milton K., to Monsanto Company. Polyphosphazene gas separation membranes. 4,710,204, Cl. 55-16.000.

Kraus, Wayne A., to Hercules Incorporated. Primer coating for cycloolefin polymer articles. 4,710,408, Cl. 427-393.500.

Krause, Larry J.; and Rider, Jack A., to Minnesota Mining and Manufacturing Company. Metallized polymers. 4,710,403, Cl. 427-304.000.

Krauss-Maffei A.G.: *See*—
Alstetter, Franz; and Hultsch, Guenther, 4,710,356, Cl. 422-140.000.

Krauter, Immanuel: *See*—
Kaiser, Gunther; and Krauter, Immanuel, 4,709,684, Cl. 123-644.000.

Kreevoy, Maurice M.: *See*—
Deetz, David W.; and Kreevoy, Maurice M., 4,710,205, Cl. 55-158.000.

Kreher, Klaus: *See*—
Wermuth, Stefan; Hauke, Gunter; and Kreher, Klaus, 4,710,289, Cl. 210-198.200.

Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogach, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, to Richter Gedeon Vegyeszeti Gyar Rt. Nitrodiaryl sulfoxide derivatives, process for their preparation and pharmaceutical and pesticidal compositions containing them as active ingredient. 4,710,323, Cl. 260-543.00R.

Kreiseder, Walter J., to Courtesy Mold & Tool Corporation. Closure with top cut tamper evident feature for wide mouth container. 4,709,830, Cl. 220-258.000.

Kreiter, Manny, to Castcraft Industries, Inc. Color proofing and color proofing transfer process using water developed ink. 4,710,447, Cl. 430-293.000.

Krishnakumar, Suppayan M.; and Nahill, Thomas E., to Continental PET Technologies, Inc. Apparatus for forming preforms with internal barrier. 4,710,118, Cl. 425-130.000.

Kristoufek, Jaroslav, to Ceskoslovenska akademie ved. Method for processing of organic materials containing nitrogen compounds. 4,710,300, Cl. 210-603.000.

Kroger, Hans: *See*—
Cordes, Hugo; and Kroger, Hans, 4,709,588, Cl. 74-103.000.

Kronies, Reinhard K.: *See*—
Kim, Dongsung R.; and Kronies, Reinhard K., 4,710,935, Cl. 371-49.000.

Kruger, Manfred; and Mucha, Lawrence S., to Coca-Cola Company; and Bosch-Siemens Hausgerate GmbH. Dispenser pouch for beverage syrups and concentrates. 4,709,835, Cl. 222-87.000.

Krupa, Robert L., Jr., to Prime Instruments, Inc. Electrical measuring meter and method including a calibrating element. 4,710,706, Cl. 324-146.000.

Krupp Polysius AG: *See*—
Henne, Heinrich; Patzelt, Norbert; Schneider, Lutz T.; Knobloch, Osbert; and Muller, Manfred, 4,709,864, Cl. 241-167.000.

Krysiak, Gary D.: *See*—
Gerace, Michael J.; Krysiak, Gary D.; and Schiappacasse, Russell F., 4,710,411, Cl. 428-34.000.

Kubert, Vince T.; and Richards, John S., to Harris Graphics Corporation. Fluid metering method and apparatus. 4,709,635, Cl. 101-426.000.

Kubo, Kanji; and Wakai, Katsuro, to Hitachi, Ltd. Access control system for storage having hardware area and software area. 4,710,894, Cl. 364-900.000.

Kubo, Masahiro, to Kabushiki Kaisha Toshiba. Rotary compressor with oil groove between journal and journal bearing. 4,710,111, Cl. 418-63.000.

Kubo, Masayoshi: *See*—
Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, 4,710,255, Cl. 156-361.000.

Kubota, Shinya: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Kuhl, Henry Y. Apparatus for conveying and washing means therefor. 4,709,713, Cl. 134-72.000.

Kuhnen, Gottfried: *See*—
Faber, Guy; and Kuhnen, Gottfried, 4,710,103, Cl. 416-219.00R.

Kuhstoss, Stuart A.: *See*—
Belagaje, Ramamoorthy; Kuhstoss, Stuart A.; and Rao, R. Nagaraja, 4,710,464, Cl. 435-91.000.

KUKA Schweissanlagen & Roboter GmbH: *See*—
Zimmer, Ernst; and Kikut, Botho, 4,710,093, Cl. 414-730.000.

Kulicki, John M.: *See*—
Stemler, J. Robert; Klingensmith, James D.; Menzemer, Craig C.; Kulicki, John M.; and Theofanis, Nicholas D., 4,709,435, Cl. 14-73.000.

Kull, Herbert, to Juwedor GmbH. Process for the galvanoplastic production of jewelry. 4,710,276, Cl. 204-9.000.

Kullmann, Eugene V.: *See*—
Hinch, Henry H.; Boyne, Gail E.; Daniels, David L.; and Kullmann, Eugene V., 4,710,946, Cl. 378-62.000.

Kulp, Jack H.; and Cunningham, Richard M., to Lukens General Industries, Inc. Traffic control elements. 4,710,053, Cl. 404-9.000.

Kumakura, Yoshiyuki: *See*—
Harada, Yuho; Maruyama, Tsutomu; Kumakura, Yoshiyuki; and Kuwayama, Shigeo, 4,710,216, Cl. 65-4.100.

Kumanoya, Masaki; Fujishima, Kazuyasu; and Dosaka, Katsumi, to Mitsubishi Denki Kabushiki Kaisha. Driving circuit for a shared sense amplifier. 4,710,901, Cl. 365-190.000.

Kunicki, Thomas J.; and Montgomery, Robert R., to Blood Center of Southeastern Wisconsin, The. Method for maintaining intact, nondegraded factor VIII/von-Willebrand factor during blood processing. 4,710,381, Cl. 424-101.000.

Kunkel, Bernd, to Messerschmitt-Bolkow-Blohm GmbH. Sensing apparatus for determining the relative position between two bodies with plural emitters and a shading member. 4,710,620, Cl. 250-203.00R.

Kunzinger, Charles A., to International Business Machines Corporation. System for decomposition of NTSC color video signals using two frame buffers. 4,710,801, Cl. 358-23.000.

Kupfer, Karl-Heinz, to U.S. Philips Corporation. Circuit arrangement for a tuner for changing over several frequency ranges. 4,710,974, Cl. 455-190.000.

Kuppenheimer, John D., Jr.; and Smith, Kirby A., to Sanders Associates, Inc. Optical detection system. 4,710,630, Cl. 250-353.000.

Kupper, Robert J.: *See*—
Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., 4,710,583, Cl. 560-40.000.

Kurahashi, Yoshio; Shiokawa, Kozo; Kagabu, Shinzo; Sakawa, Shinji; and Moriya, Koichi, to Nihon Tokushu Noyaku Seizo K.K. Novel N-benzyl-cyclopropanecarboxamide fungicides. 4,710,518, Cl. 514-624.000.

Kurahashi, Yoshio: *See*—
Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, 4,710,509, Cl. 514-384.000.

Kurata, Nobutaka: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Kurata, Norihiro: *See*—
Motodate, Shoji; Morino, Yuichi; and Kurata, Norihiro, 4,710,599, Cl. 200-61.850.

Kuribayashi, Masaki; Nakazawa, Toshihiko; and Kanbe, Junichiro, to Canon Kabushiki Kaisha. Ferroelectric display panel and driving method therefor to achieve gray scale. 4,709,995, Cl. 350-350.00S.

Kuroishi, Nobuhito: *See*—
Doi, Yoshihiko; Kuroishi, Nobuhito; Ochi, Shigeki; and Uenishi, Noboru, 4,710,345, Cl. 419-28.000.

Kurokawa, Haruo, to General Electric Company. Telephone unit adapted for vertical and horizontal mounting. 4,710,596, Cl. 379-424.000.

Kuroyanagi, Masatoshi: *See*—
Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, 4,710,106, Cl. 417-213.000.

Kurtovic, Zlatko: *See*—
Grabovac, Bosko; and Kurtovic, Zlatko, 4,709,602, Cl. 81-483.000.

Kusakabe Electric & Machinery Co. Ltd.: *See*—
Akiyama, Masashi; and Tagashira, Yasuo, 4,709,845, Cl. 228-17.000.

Kusters, Eduard: *See*—
Appenzeller, Valentin, deceased; Appenzeller, Maria, heir; Appenzeller, Regine, heir; Pegels, Doris, heir; and Appenzeller, Ernst, heir, 4,709,629, Cl. 100-162.00B.

Kuwayama, Shigeo: *See*—
Harada, Yuho; Maruyama, Tsutomu; Kumakura, Yoshiyuki; and Kuwayama, Shigeo, 4,710,216, Cl. 65-4.100.

Kwiatek, Alfred; and Schwartz, Jack W., to Jonergin, Inc. Therapeutic device for the administration of medicaments. 4,710,191, Cl. 604-897.000.

Kwok, Kwan S.: *See*—
Bernard, John A.; Henry, Allan F.; Lanning, David D.; and Kwok, Kwan S., 4,710,341, Cl. 376-216.000.

Kyffin, Morris N.: *See*—
Douglas, Peter G.; and Kyffin, Morris N., 4,710,815, Cl. 358-186.000.

Kyowa Chemical Industry Co., Ltd.: *See*—
Miyata, Shigeo, 4,710,551, Cl. 526-91.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Katsumata, Ryoichi; Ozaki, Akio; Oka, Tetsuo; and Furuya, Akira, 4,710,471, Cl. 435-253.000.
Uwajima, Takayuki; and Aisaka, Kazuo, 4,710,470, Cl. 435-200.000.

Labate, Micheal D. Protective sleeve for the shroud of a hot metal ladle. 4,709,748, Cl. 164-488.000.

LaBate, Micheal D. Slag retaining device for use in converters, ladles, or the like. 4,709,903, Cl. 266-227.000.

LaBudde, Brian R.; and Koek, Kevin C., to Eastman Kodak Company. Keyboard cabinet with sliding tray. 4,709,972, Cl. 312-208.000.

Lacey, Paul D.: *See*—
Chapman, Victor B.; and Lacey, Paul D., 4,710,963, Cl. 382-7.000.

Lacey, Richard F., to Hewlett-Packard Company. Support for a moving mirror in an interferometer. 4,710,001, Cl. 350-632.000.

Ladewig, Dieter; and Ramcke, Bernd, to E.C.H. Will (GmbH & Co.). Apparatus for attaching flap-over covers to stacks of paper sheets or the like. 4,710,256, Cl. 156-484.000.

Lagakos, Nicholas: *See*—
Blackburn, Douglas; Feldman, Albert; and Lagakos, Nicholas, 4,709,987, Cl. 350-96.340.

LaGrange, Alain: *See*—
Lang, Gerard; Forestier, Serge; and LaGrange, Alain, 4,710,584, Cl. 560-51.000.

Lahaye, Marcel, to Spadel S.A. Controlling and reducing opening torques of caps and lids. 4,710,409, Cl. 427-421.000.

Laier, James E. Method and apparatus for building up beaches and protecting shorelines. 4,710,057, Cl. 405-30.000.

Laing, Johannes L. N.: *See*—
Laing, Oliver; and Laing, Johannes L. N., 4,710,100, Cl. 416-11.000.

Laing, Oliver; and Laing, Johannes L. N. Wind machine. 4,710,100, Cl. 416-11.000.

Lakshmanan, Raman: *See*—
Blackwell, Catherine A.; Lakshmanan, Raman; and Subramanian, Mahadevan, 4,710,870, Cl. 364-200.000.

Lam, Clive C.: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Lampl, Josef, to Siemens Aktiengesellschaft. Speech control in a telephone station. 4,710,953, Cl. 379-391.000.

Lance, Mark A., to W.A. Deutsher Proprietary Limited. Whistle. 4,709,651, Cl. 116-137.00R.

Lancraft, Inc.: *See*—
Kelly, John E.; Jones, Don C.; Tuck, Frederick R.; Zimmermann, William A.; and Clark, Kenneth R., 4,710,031, Cl. 356-440.000.

Landen, Terry R.: *See*—
Tucker, James L.; Landen, Terry R.; and Schelby, Robert L., 4,710,115, Cl. 425-117.000.

Landsberger, Albert. Therapeutic agent for the use in cancer treatment. 4,710,493, Cl. 514-56.000.

Lane, Bennie L. Universal fascia assembly for securing a membrane to a roof. 4,709,518, Cl. 52-94.000.

Lang, Gerard; Forestier, Serge; and LaGrange, Alain, to L'Oreal. Derivatives of 3-benzylidene camphor, process for their preparation and their use as protective agents against UV rays and as medicaments. 4,710,584, Cl. 560-51.000.

Lang, James J., to Campbell, Joseph J.; and Equivest, Inc. Method for improving the utilization of polyelectrolytes in dewatering aqueous suspensions. 4,710,304, Cl. 210-734.000.

Langen, Hans; Schutz, Heinz-Dieter; Himmelmann, Wolfgang; Wernicke, Ubbo; and Renner, Gunter. Photographic recording material and a process for the production of photographic images. 4,710,454, Cl. 430-546.000.

Lanning, David D.: *See*—
Bernard, John A.; Henry, Allan F.; Lanning, David D.; and Kwok, Kwan S., 4,710,341, Cl. 376-216.000.

Lapatovich, Walter P.: *See*—
Budinger, A. Bowman; and Lapatovich, Walter P., 4,710,679, Cl. 315-58.000.

Lappe, Peter: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,710,321, Cl. 200-501.150.

Larsen, Richard R., to Pacific Scientific Co. Modular metallic bellows assembly. 4,710,050, Cl. 403-51.000.

Larson, Jeffrey L.: *See*—
Hershberger, Charles L.; and Larson, Jeffrey L., 4,710,466, Cl. 435-91.000.

Larson, John W.; and Breault, Ronald W., to Riley Stoker Corporation. Flow control device for solid particulate material. 4,709,663, Cl. 122-4.00D.

Lash, Glen R., to Procter & Gamble Company, The. Shaped disposable diapers with shaped elastically contractible waistbands. 4,710,189, Cl. 604-385.00A.

Lat, Michael V.: *See*—
Kortschinski, Juri; Lat, Michael V.; Maurice, Claude G.; and Tickner, Derek C., 4,710,847, Cl. 361-125.000.

Latimer, Margaret G.: *See*—
Sneyd, James C., Jr.; Harris, Robert D.; and Latimer, Margaret G., 4,710,185, Cl. 604-372.000.

Latka, Henry C., to General Signal Corporation. System for controlling the diameter of a crystal in a crystal growing furnace. 4,710,258, Cl. 156-601.000.

Lattuada, Charles P.; and Gladden, Frank R., Jr., to Environmental Diagnostics, Inc. Method for preserving plated media and product. 4,709,819, Cl. 206-524.800.

Launes, Joaquin J., to Play, S. A. Reclinable children's chair. 4,709,960, Cl. 297-250.000.

Lauterbach-Dammler, Inge: *See*—
Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, 4,710,607, Cl. 219-121.00P.

Lavelette, William J. Shingle removing machine. 4,709,479, Cl. 30-170.000.

Laverty, Martin J., Jr., to Coyne & Delany Co. Disabler system for plumbing fixture. 4,709,427, Cl. 4-427.000.

Law, Anthony G.; and Fleetwood, Michael J., to Inco Enginered Products Ltd.; and General Electric Company plc, The. Casting metal strip. 4,709,743, Cl. 164-463.000.

Law, Yee-Shing: *See*—
Wu, Joseph C.; Law, Yee-Shing; and James, John, 4,710,970, Cl. 455-113.000.

Layre, John; Park, Yong S.; and Schollhamer, George K., to Gross-Given Manufacturing Co. Dispensing machine for tea. 4,709,625, Cl. 99-289.00R.

Lazarow, Normand H.; and Bove, Alfred A., to Mayo Foundation. Imaging system and method using radiopaque microspheres for evaluation of organ tissue perfusion. 4,709,703, Cl. 128-654.000.

Lazorthes, Guy, to Applied Precision Limited. Implantable device for chronically injecting a substance, in particular a therapeutant. 4,710,167, Cl. 604-93.000.

Lebas, Jean-Marie; Rat, Pierre; Dupont, Jean-Marcel; and Vinuesa, Germain, to Basset Bretagne Loire - B.B.L.; and Societe Nationale des Poudres et Explosifs. Method of manufacturing articles of compacted powder. 4,710,329, Cl. 264-3.100.

Leben, Yannick; and D'Ussel, Louis, to SAFT, S.A. Activatable battery. 4,710,438, Cl. 429-119.000.

LeBlanc, Guy: *See*—
Bryson, Neil B.; Auchterlonie, David T. T.; LeBlanc, Guy; and Newberry, Vincent J., 4,709,744, Cl. 164-472.000.

Le Caer, Gerard; and Dubois, Jean-Marie, to Centre National de la Recherche Scientifique "CNRS". Amorphous aluminum-based alloys. 4,710,246, Cl. 148-403.000.

Lechtken, Peter; Buethe, Ingolf; Jacobi, Manfred; and Trimborn, Werner, to BASF Aktiengesellschaft. Photocurable compositions with acylphosphine oxide photoinitiator. 4,710,523, Cl. 522-14.000.

Lee, Alejandro C.: *See*—
Shurtleff, Jill M.; and Lee, Alejandro C., 4,709,476, Cl. 30-41.000.

Lee, Duk-Hi; Feierberg, Susan E.; and Mayer, Patricia, to Du Pont de Nemours, E. I., and Company. Autofluorogram composition. 4,710,319, Cl. 252-646.000.

Lee, Jay: *See*—
Stern, Howard; Mauro, Alex; and Lee, Jay, 4,709,858, Cl. 239-296.000.

Lee, Robert W.; and Schaffel, Neal A., to General Motors Corporation. Hot pressed permanent magnet having high and low coercivity regions. 4,710,239, Cl. 148-101.000.

Leeds, Richard; and Roberts, Arthur, to Global Equipment Company. Computer work station. 4,709,971, Cl. 312-201.000.

Leenders, Luc H.; Daems, Eddie R.; and Van den Bogaert, Jan A., to AGFA-Gevaert N.V. Process for the formation of linework or halftone multicolor colloid patterns. 4,710,444, Cl. 430-237.000.

Lehmann, Hans-Dieter: *See*—
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, 4,710,496, Cl. 514-183.000.

Lehmann, Leonard: *See*—
Alvarez, Robert; Lehmann, Leonard; and Strul, Bruno, 4,710,624, Cl. 250-228.000.

Lehner, Gerald J.: *See*—
Burke, Michael J.; Pidsosny, Richard A.; and Lehner, Gerald J., 4,710,888, Cl. 364-561.000.

Lehnhoff, Richard N.; and Disser, Robert J., to General Motors Corporation. Vehicle power window control circuit with reverse battery protection. 4,710,685, Cl. 318-287.000.

Leidel, Dieter S. Method of reclaiming green sand. 4,709,862, Cl. 241-23.000.

Leifeld, Ferdinand, to Trutzschler GmbH & Co. KG. Method and apparatus for feeding a fiber tuft opener or cleaner. 4,709,451, Cl. 19-105.000.

Leman, Robert: *See*—
McCutcheon, Samuel; Lum, Jeffrey; Solek, Roman; Harrell, Troy; and Leman, Robert, 4,710,893, Cl. 364-900.000.

Lemelson, Jerome H. Communication system and method. 4,710,977, Cl. 455-603.000.

Lemons, David H.; and Spector, George. Full body hydromassager having an eccentric weight rotor. 4,709,691, Cl. 128-66.000.

Lempa, Bernard J., Jr. Herbicide applicator apparatus. 4,709,505, Cl. 47-1.700.

Lenart, Joseph M.: *See*—
Amstutz, Stanford R.; Eliscu, Mark; Lenart, Joseph M.; and Haselton, E. Fletcher, 4,710,916, Cl. 370-58.000.

Lenger, Sidney A., to Pilliod Cabinet Company, The. Adjustable table structure. 4,709,641, Cl. 108-102.000.

Lengsfeld, Karl; Link, Erich; Martin, Adolf; and Wittler, Hilmar, to Frankl & Kirchner GmbH & Co KG. Electromotive variable-speed and control drive particularly for use in industrial sewing machines. 4,709,794, Cl. 192-18.00B.

Leonardo, Ignazio: *See*—
Coll, Gene P.; and Leonardo, Ignazio, 4,709,980, Cl. 350-96.200.

Lepand, Heinz; Huser, Margrit; Biniasz, Franz-Josef; and Fuchs, Axel, to Hoesch Aktiengesellschaft. Dredger teeth. 4,710,244, Cl. 148-333.000.

Leppanen, Jarmo, to Oy Tampella AB. Method, a device and a means for carrying out wire bolting of a rock. 4,710,065, Cl. 405-303.000.

Lepperhoff, Gerhard, to FEV Motorentechnik GmbH & Co. KG. Assembly for engine exhaust gas particulate filter traps. 4,709,549, Cl. 60-295.000.

Lepperhoff, Gerhard: *See*—
Pischinger, Franz; Lepperhoff, Gerhard; and Huthwohl, Georg, 4,709,547, Cl. 60-274.000.

Lerner, Michael; Bernstein, Michael; and Selame, Robert, to Safety 1st, Inc. Bathtub spout cover. 4,709,429, Cl. 4-661.000.

Leth, James W.: *See*—
Brown, Donald W.; Leth, James W.; and Vandendorpe, James E., 4,710,926, Cl. 371-9.000.

Levin, Nathan W.; and Zasuwa, Gerard A., to Henry Ford Hospital. Automated hemodialysis control based upon patient blood pressure and heart rate. 4,710,164, Cl. 604-66.000.

Levrai, Roland: *See*—
Sauvee, Jean P.; Riquart, Christian; and Levrai, Roland, 4,709,550, Cl. 60-562.000.

Lewand, Willi: *See*—
Ziebig, Anton; Brigasky, Hans; and Lewand, Willi, 4,710,123, Cl. 425-464.000.

Lewandowski, Dieter; Ostermoor, Rolf; and Spranger, Dieter, to Olympia Aktiengesellschaft. Application of the laser jet method for inscribing office machine keyboard buttons. 4,710,330, Cl. 264-25.000.

Lewis, Edward T., to Raytheon Company. Transmission-gate structured logic circuits. 4,710,649, Cl. 307-451.000.

Lewis, Henry W.; and Van Roojen, Jan, to Ingersoll Milling Machine Company, The. Interchangeable spindle-head milling system. 4,709,465, Cl. 29-568.000.

Lewis, James M.; and Blakeney, Andrew J., to Petrarch Systems, Inc. High contrast low metal ion positive photoresist developing method using aqueous base solutions with surfactants. 4,710,449, Cl. 430-326.000.

Lewis, John A., Jr.: *See*—
Haber, Terry M.; Foster, Clark B.; and Lewis, John A., Jr., 4,710,179, Cl. 604-211.000.

Lgz Landis & Gyr Zug AG: *See*—
Baltes, Heinrich P.; and Huiser, Andre M. J., 4,710,627, Cl. 250-339.000.
Petr, Jan, 4,710,652, Cl. 307-491.000.

Li, Chou H. Self-optimizing method and machine. 4,710,864, Cl. 364-148.000.

Liang, Theming; and Slater, Eve E., to Merck & Co., Inc. Novel phosphotyrosyl protein phosphatase. 4,710,469, Cl. 435-194.000.

Libert, James T.; and Curran, Earl J., Jr., to Square D Company. Self calibration of the thyristor firing angel of a motor controller using a current window to determine a final value of a reference current lag phase angle. 4,710,692, Cl. 318-729.000.

Liberty Diversified Industries: *See*—
Stoll, Mark S., 4,709,852, Cl. 229-119.000.

Licentia Patent-Verwaltungs-GmbH: *See*—
Dambkes, Heinrich; Herzog, Hans-J.; and Jorke, Helmut, 4,710,788, Cl. 357-22.000.

Liefer, Allen C.; Loewen, Gilbert L.; and Magathan, Paul J. Modular floor panel system. 4,709,519, Cl. 52-98.000.

Life Technology Research Found.: *See*—
Sekiguchi, Yukio; Funakubo, Hiroyasu; Sakanoue, Hitoyuki; and Komura, Osamu, 4,709,844, Cl. 228-3.100.

Lill, Helmut: *See*—
Bartl, Knut; and Lill, Helmut, 4,710,459, Cl. 435-13.000.

Lim, Sam K., to Genicom Corporation. Diasywheel printer with improved adjustable carriage assembly and cartridge latching member. 4,710,045, Cl. 400-352.000.

Lin, Brian: *See*—
Lin, Jerry; Lin, Brian; and Lin, Tiung-Jen, 4,709,937, Cl. 280-11.200.

Lin, Jerry; Lin, Brian; and Lin, Tiung-Jen. Two-wheeled combination roller skate-ski. 4,709,937, Cl. 280-11.200.

Lin, Jong-Tsuen; and Ho, Chien-Han. Structure of electric heater. 4,710,612, Cl. 219-547.000.

Lin, Jui C. United opening device for a double-locked door. 4,709,565, Cl. 70-107.000.

Lin, Tai-Shun; and Prusoff, William H., to Yale University. 3'-azido-2',3'-dideoxy-5-halouridine and its use in treating patients infected with retroviruses. 4,710,492, Cl. 514-50.000.

Lin, Tiung-Jen: *See*—
Lin, Jerry; Lin, Brian; and Lin, Tiung-Jen, 4,709,937, Cl. 280-11.200.

Linde Aktiengesellschaft: *See*—
Sapper, Rainer; and Kick, Helmut, 4,710,213, Cl. 62-28.000.

Lindeman, Richard J., to TRW Inc. Electrical connectors. 4,710,133, Cl. 439-92.000.

Linder, Jacques F., to Hughes Aircraft Company. Method of fabricating ultra-thin flex cables. 4,710,448, Cl. 430-314.000.

Lindstrom, Donald E.; and Setzer, David T., to Reynolds Metals Company. Air conveyor. 4,710,068, Cl. 406-88.000.

Linhofer, Gerhard: *See*—
Blahous, Leopold; and Linhofer, Gerhard, 4,710,735, Cl. 333-175.000.

Link, Erich: *See*—
Lengsfeld, Karl; Link, Erich; Martin, Adolf; and Wittler, Hilmar, 4,709,794, Cl. 192-18.00B.

Lion Corporation: *See*—
Miyajima, Nobuyuki; Hata, Kenji; and Nakayama, Junichi, 4,710,313, Cl. 252-105.000.

Liotta, Domingo S.; and Troncoso De Liotta, Holga E. Diaphragm and method for occlusion of the descending thoracic aorta. 4,710,192, Cl. 623-1.000.

Lipinski, Henry, to Lipinski, Henry; Lipinski, Theresa Janet; Sobocienski, James Robert; and Sobocienski, Lorraine. Skid-out highrise fire escape device. 4,709,782, Cl. 182-3.000.

Lipinski, Theresa Janet: *See*—
Lipinski, Henry, 4,709,782, Cl. 182-3.000.

Lipps, Wolfgang: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,710,321, Cl. 200-501.150.

Lipson, David; Liu, Benjamin L.; and Loebel, Nicolas G., to Eli Lilly and Company. Optical fiber catheter with fiber-contained reactive element. 4,710,623, Cl. 250-227.000.

Lisa, Rudolph E.: *See*—
Finnan, Jeffrey L.; Lisa, Rudolph E.; and Schmidt, Douglass N., 4,710,519, Cl. 514-629.000.

Lisi, Marco: *See*—
Roederer, Antoine G.; Doro, Guilio; and Lisi, Marco, 4,710,776, Cl. 343-778.000.

Litteken, Mark A., to International Business Machines Corp. Generating figures in a document formatter directly from a declarative tag. 4,710,885, Cl. 364-518.000.

Littleton, Jody; and Davis, Gary W., to Tamworth, Inc. Automatic cup pig launching and retrieving system. 4,709,719, Cl. 137-268.000.

Litton Systems, Inc.: *See*—
Bonenberger, Kenneth E., 4,710,131, Cl. 439-13.000.
Fersht, Samuel N.; and Fersht, Rena S., 4,710,027, Cl. 356-350.000.
Myers, William P., 4,709,575, Cl. 73-23.000.

Liu, Benjamin L.: *See*—
Lipson, David; Liu, Benjamin L.; and Loebel, Nicolas G., 4,710,623, Cl. 250-227.000.

Liu, Chung-Heng: *See*—
Meyers, Peter V.; Liu, Chung-Heng; and Frey, Timothy J., 4,710,589, Cl. 136-258.0PC.

Liu, Ping Y., to General Electric Company. Low gloss, flame retardant, impact resistant polycarbonate composition. 4,710,534, Cl. 524-411.000.

Liu, Yow-Juang (Bill), to Advanced Micro Devices, Inc. Non-selective implantation process for forming contact regions in integrated circuits. 4,709,467, Cl. 437-30.000.

Liu, Yuan K., to Del Monte Corporation. Method for treating pineapples. 4,710,388, Cl. 426-102.000.

Livingston, Douglas A.; and Petre, Janet E., to Upjohn Company, The. Thesis of 7-halo-7-deoxylincomycins. 4,710,565, Cl. 536-16.500.

Ljungberg, Per-Allan, to Tetra Pak International AB. Arrangement for orienting articles on a conveyor. 4,709,799, Cl. 198-412.000.

Ljungberg, Robert. Stress brace. 4,709,893, Cl. 248-360.000.
Lloyd, Kenneth O.: *See*—
Dupont, Bo; Morishima, Yasuo; Collins, Nancy; Ogata, Shunichiro; and Lloyd, Kenneth O., 4,710,457, Cl. 435-7.000.
Locatelli, Renato: *See*—
Bertelli, Guido; and Locatelli, Renato, 4,710,528, Cl. 524-100.000.
Lockheed Missiles & Space Company, Inc.: *See*—
Galbraith, Andrew D., 4,709,882, Cl. 244-53.00R.
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, to Troponwerke GmbH & Co., KG. N-glycosylated carboxylic acid derivatives as agents for combating rheumatic diseases. 4,710,491, Cl. 514-42.000.
Loebel, Nicolas G.: *See*—
Lipson, David; Liu, Benjamin L.; and Loebel, Nicolas G., 4,710,623, Cl. 250-227.000.
Loewen, Gilbert L.: *See*—
Liefer, Allen C.; Loewen, Gilbert L.; and Magathan, Paul J., 4,709,519, Cl. 52-98.000.
LogEtronics, Inc.: *See*—
Cagey, Lee B., 4,709,913, Cl. 271-207.000.
Loheac, Charles, to Tabur Caoutchouc. Keyboard for the control box of an electric apparatus. 4,710,597, Cl. 200-5.00A.
Lonseal: *See*—
Tomioka, Hisatsugu; Waki, Tatsuo; and Miyata, Yoshiki, 4,709,783, Cl. 182-8.000.
Lonza Ltd.: *See*—
Periard, Jacques; and Cron, Alain, 4,710,307, Cl. 252-18.000.
Lopez, Jaime; and Pasek, Eugene A., to Chevron Research Company. Process for preparing heavy oil hydroprocessing slurry catalyst. 4,710,486, Cl. 502-219.000.
Loqvist, Kaj-Ragnar, to Seco Tools AB. Cutting insert for chip forming machining. 4,710,069, Cl. 407-114.000.
L'Oreal: *See*—
Grollier, Jean F.; and Dubief, Claude, 4,710,374, Cl. 424-61.000.
Lang, Gerard; Forestier, Serge; and LaGrange, Alain, 4,710,584, Cl. 560-51.000.
Madrange, Annie; and Canivet, Patrick, 4,710,314, Cl. 252-117.000.
Lorensen, William E.: *See*—
Cline, Harvey E.; and Lorensen, William E., 4,710,876, Cl. 364-414.000.
Lorenz, Rainer, to Palitex Project-Company GmbH. Pre-take-up roller mechanism for varying the tension on a running thread in a thread processing machine. 4,709,543, Cl. 57-58.700.
Lovell, Roger. Propeller shaft bearing assembly. 4,710,142, Cl. 440-83.000.
Loveridge, Ronald, to Ruxley Holdings Ltd.; and Kilfa Limited. Measurement of contact lenses. 4,710,023, Cl. 356-124.000.
Lowry, Hugh R.; and Frost, Robert T., to General Electric Company. Continuous metal casting apparatus. 4,709,749, Cl. 164-503.000.
Loy, Fernand R., to U.S. Philips Corporation. Opto-mechanical scanner with fixed-field ranging device. 4,710,621, Cl. 250-203.00R.
Loyd, Lewis: *See*—
Knipp, Randall S.; and Loyd, Lewis, 4,710,158, Cl. 493-328.000.
Lozier, Benjamin F.: *See*—
Anders, Walter G.; Grosswiller, Leo J., Jr.; Lozier, Benjamin F.; and Rozlosnik, Alan J., 4,710,098, Cl. 415-149.00A.
Lubrizol Corporation, The: *See*—
Malone, Gilbert R.; Skursha, Susan K.; and Jost, Robert M., 4,710,474, Cl. 436-60.000.
Lucas Industries Public Limited Company: *See*—
Dawes, Cyril; and Tranter, Donald F., 4,710,238, Cl. 148-16.600.
Lucas, Peter A.: *See*—
Bogan, Gary W.; Lucas, Peter A.; Monnerat, Georgia A.; and Aldrich, Dale J., 4,710,429, Cl. 428-417.000.
Luceri, Thomas J.: *See*—
DeRossett, Edmund Z.; and Luceri, Thomas J., 4,710,186, Cl. 604-383.000.
Luckey, George W.; Roth, Bernard; Brendel, Kathleen E.; and Den Dunne, Margaret S., to Eastman Kodak Company. High efficiency fluorescent screen pair for use in low energy X radiation imaging. 4,710,637, Cl. 250-486.100.
Ludvigsen, Poul F. B., to Brdr. Ludvigsen, Tommfrup APS. Apparatus for the application of a strip along the side edges of a sheet. 4,710,084, Cl. 412-9.000.
Luhowyj, Vladimir. Panel installation tool and method. 4,709,460, Cl. 29-271.000.
Lukasiewicz, Mark, to Kendall Company, The. Monitoring device for bio-signals. 4,709,704, Cl. 128-644.000.
Lukaszonas, William S. Swivel shutter assembly. 4,709,506, Cl. 49-88.000.
Lukens General Industries, Inc.: *See*—
Kulp, Jack H.; and Cunningham, Richard M., 4,710,053, Cl. 404-9.000.
Lum, Jeffrey: *See*—
McCutcheon, Samuel; Lum, Jeffrey; Solek, Roman; Harrell, Troy; and Leman, Robert, 4,710,893, Cl. 364-900.000.
Lundberg, Robert D.: *See*—
Peiffer, Dennis G.; and Lundberg, Robert D., 4,710,555, Cl. 526-240.000.
Lyons, Harold W.: *See*—
Berke, Howard M.; and Lyons, Harold W., 4,710,749, Cl. 340-405.000.
Lytle, Donald A.: *See*—
Sidaway, H. John; and Lytle, Donald A., 4,709,723, Cl. 137-584.000.
M.A.N.-ROLAND Druckmaschinen Aktiengesellschaft: *See*—
Hammer, Josef; and Handschuher, Walter, 4,709,872, Cl. 242-75.430.
M-B-W Inc.: *See*—
Maass, Helmut; and Klatzka, Joseph H., 4,710,055, Cl. 404-112.000.
M. W. Kellogg Company, The: *See*—
Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., 4,710,214, Cl. 62-28.000.
Maass, Helmut; and Klatzka, Joseph H., to M-B-W Inc. Riding-type multiple trowel machine. 4,710,055, Cl. 404-112.000.
Machida, Toyoji; and Ueno, Shyuichi, to Sanyo Electric Co., Ltd. Method of manufacturing spiral electrode assembly. 4,709,472, Cl. 29-623.000.
Machler, Meinrad, to Carl-Zeiss-Stiftung. Chassis for optical instruments. 4,709,989, Cl. 350-321.000.
Macy, Dennis W., to Colorado State University Research Foundation. Method for detection of Cushing's syndrome in domestic animals. 4,710,370, Cl. 424-9.000.
Madan, Arun: *See*—
Ovshinsky, Stanford R.; and Madan, Arun, 4,710,786, Cl. 357-2.000.
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., to Denning Mobil Robotics, Inc. Beacon proximity detection system for a vehicle. 4,710,020, Cl. 356-1.000.
Madrange, Annie; and Canivet, Patrick, to L'Oreal. Detergent cosmetic composition containing a soap and cationic compound. 4,710,314, Cl. 252-117.000.
Maeda, Fujio, to Kabushiki Kaisha Komatsu Seisakusho. Planetary gear type transmission system. 4,709,594, Cl. 74-753.000.
Maegawa, Harumi; Takai, Sakan; Sukeda, Toshiaki; Irie, Shoji; and Kobata, Shoichi, to Fujitsu Limited. Magnetic bubble memory module with protected terminals. 4,710,895, Cl. 365-2.000.
Maehara, Yasuhiro: *See*—
Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Maehara, Yasuhiro; and Yasumoto, Kunio, 4,709,572, Cl. 72-366.000.
Maffert, Jerome: *See*—
Grenier, Gilles; Maffert, Jerome; Merle, Jean-Pierre; and des Ordons, Jacques R., 4,710,028, Cl. 356-375.000.
Magathan, Paul J.: *See*—
Liefer, Allen C.; Loewen, Gilbert L.; and Magathan, Paul J., 4,709,519, Cl. 52-98.000.
Magennis, Thomas P.: *See*—
Keady, Peter; and Magennis, Thomas P., 4,709,817, Cl. 206-523.000.
Maghemite Inc.: *See*—
Whiteley, Eric, 4,710,667, Cl. 310-268.000.
Magill-Stephenson Company Limited: *See*—
Briltz, Raymond P., 4,710,290, Cl. 210-199.000.
Magome, Nobutaka; and Ichihara, Yutaka, to Nippon Kogaku K. K. Position detection apparatus. 4,710,026, Cl. 356-349.000.
Mahaffee, Joseph W., III: *See*—
Douglass, Harold E., Jr.; and Mahaffee, Joseph W., III, 4,709,652, Cl. 116-140.000.
Mahaffy & Harder Engineering Co.: *See*—
Mahaffy, Reid A.; Garson, Eugene; and Ostrow, Milan R., 4,709,535, Cl. 53-473.000.
Mahaffy, Reid A.; Garson, Eugene; and Ostrow, Milan R., to Mahaffy & Harder Engineering Co. Packaging loader apparatus for sliced food products. 4,709,535, Cl. 53-473.000.
Maher, Joseph G.: *See*—
Kennedy, Gary D.; and Maher, Joseph G., 4,709,494, Cl. 40-152.000.
Maines, Robert, to R. J. Harvey Instrument Corporation. Nylon strips for medical assay. 4,710,458, Cl. 435-12.000.
Mallow, William A., to Southwest Research Institute. Fluidization of limestone slurries and resultant products. 4,710,226, Cl. 106-119.000.
Malone, Gilbert R.; Skursha, Susan K.; and Jost, Robert M., to Lubrizol Corporation, The. Method of analyzing high molecular weight dispersants in motor oils. 4,710,474, Cl. 436-60.000.
Mangiavacchi, Jacques, to Glaenzer Spicer. Sealing device for a universal joint. 4,710,150, Cl. 464-14.000.
Mangler, Rolf: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.
Mannesmann AG: *See*—
Frommann, Klaus, 4,710,240, Cl. 148-156.000.
Roether, Kurt, 4,710,245, Cl. 148-12.400.
Mannesmann Rexroth GmbH: *See*—
Bartholomaus, Reiner; and Widmann, Karlheinz, 4,709,619, Cl. 92-130.00D.
Manning, David J., to General DataComm, Inc. Bit interleaved multiplexer system providing byte synchronization for communicating apparatuses. 4,710,920, Cl. 370-100.000.
Mantyla, Jim. Flexible closure for resealing containers. 4,709,832, Cl. 220-306.000.
Manville Corporation: *See*—
Olsen, Peter C., Jr.; Conforto, Peter M.; Craighead, Jimmy R.; and Wolf, David L., 4,709,538, Cl. 53-566.000.
Marcantonio, Gabriel, to Northern Telecom Limited. Integrated circuit chip package. 4,710,798, Cl. 357-80.000.
Mardak, Keith R., to Hal Leonard Publishing Corporation. Portable viewing stand. 4,709,895, Cl. 248-460.000.

Mares, Frank: *See—*
Boyle, William J., Jr.; Mares, Frank; and Corbo, Andrea M., 4,710,545, Cl. 525-340.000.
Maresca, Louis M., to Amoco Corporation. Stabilizing polyaryletherketones. 4,710,562, Cl. 528-125.000.
Marinaccio, Paul J.: *See—*
Harvey, Andrew C.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,709,453, Cl. 24-442.000.
Marine Moisture Control Company, Inc.: *See—*
Schmukler, Charles S.; and Buon, Georges A., 4,710,643, Cl. 250-573.000.
Maris, Humphrey J.: *See—*
Tauc, Jan; Maris, Humphrey J.; and Thomsen, Christian, 4,710,030, Cl. 356-432.000.
Markert, Gerhard: *See—*
Kraemer, Dieter; Siol, Werner; Markert, Gerhard; Suetterlin, Norbert; and Feil, Cornelia, 4,710,525, Cl. 523-201.000.
Markle, Wilson; and Mitchell, Christopher, to Colorization Inc. Method of, and apparatus for, modifying luminance levels of a black and white video signal. 4,710,805, Cl. 358-81.000.
Marksteiner, William K.: *See—*
Cantwell, Robert H.; Marksteiner, William K.; and Hansen, V. Gregers, 4,710,772, Cl. 342-92.000.
Marris, Derrick A.: *See—*
Voorhis, Roger; Erbs, Daryl G.; Palmer, John M.; and Marris, Derrick A., 4,709,560, Cl. 62-508.000.
Marshall, Dennis L.: *See—*
Brilmyer, George H.; and Marshall, Dennis L., 4,710,280, Cl. 204-146.000.
Martens, Ernst, to Alphair Ventilating Systems Inc. Auger construction for machines for forming hollow core concrete slabs. 4,710,112, Cl. 425-64.000.
Martin, Adolf: *See—*
Lengsfeld, Karl; Link, Erich; Martin, Adolf; and Wittler, Hilmar, 4,709,794, Cl. 192-18.00B.
Martin, James W., to Engineering Patents & Equipment Limited. Parachute system and aircraft ejection seat incorporating the same. 4,709,885, Cl. 244-141.000.
Martin Marietta Corporation: *See—*
Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 4,710,348, Cl. 420-129.000.
Martin, Patricia A.: *See—*
Hereth, Michael R.; and Martin, Patricia A., 4,710,903, Cl. 365-194.000.
Martino, Ronald J., to Bausch & Lomb Incorporated. Reticle plate having a fluorescing pattern. 4,710,636, Cl. 250-467.100.
Martwick, Wilford E.: *See—*
Broden, David E.; Martwick, Wilford E.; and Warren, John B., 4,709,638, Cl. 102-522.000.
Marubeni Kabushiki Kaisha: *See—*
Komano, Tohru; and Ohyma, Kanji, 4,710,461, Cl. 435-68.000.
Maruyama, Tsutomu: *See—*
Harada, Yuho; Maruyama, Tsutomu; Kumakura, Yoshiyuki; and Kuwayama, Shigeo, 4,710,216, Cl. 65-4.100.
Marvin Glass & Associates: *See—*
Breslow, Jeffrey D.; Morrison, Howard J.; Hanson, Steven P.; and Rasmussen, Russell G., 4,710,873, Cl. 364-410.000.
Rasmussen, Russell G.; Stubenfoll, Leonard J.; and Disko, Harry, 4,710,146, Cl. 446-308.000.
Masaki, Akira: *See—*
Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, 4,710,854, Cl. 361-414.000.
Masaki, Kazumi, to Hayashibara, Ken. Resonant vibration-transmitting apparatus. 4,710,655, Cl. 310-30.000.
Masaki, Kazumi, to Hayashibara, Ken. Phase-controlled automatic switching circuit. 4,710,698, Cl. 323-239.000.
Mashiko, Koichiro: *See—*
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, 4,710,789, Cl. 357-23.600.
Massachusetts Institute of Technology: *See—*
Bernard, John A.; Henry, Allan F.; Lanning, David D.; and Kwok, Kwan S., 4,710,341, Cl. 376-216.000.
Feldman, Joel A.; and Hofstetter, Edward M., 4,710,959, Cl. 381-36.000.
Masuda, Katsuhiko: *See—*
Fuke, Akira; Tokita, Yasuhiro; and Masuda, Katsuhiko, 4,710,938, Cl. 372-56.000.
Masuda, Takashi; Nakamura, Yukitugu; and Sekiguchi, Kyoji, to Canon Kabushiki Kaisha. Cornea shape measuring apparatus. 4,710,003, Cl. 351-212.000.
Masuhara, Toshiaki: *See—*
Hanamura, Shoji; Aoki, Masaaki; and Masuhara, Toshiaki, 4,710,648, Cl. 307-443.000.
Masumoto, Hakaru; and Murakami, Yuetsu, to Foundation: The Research Institute of Electric and Magnetic Alloys, The. Wear-resistant alloy of high permeability and method of producing the same. 4,710,243, Cl. 148-312.000.
Masuoka, Fujio; and Ochii, Kiyofumi, to Kabushiki Kaisha Toshiba. Semiconductor memory device comprising six-transistor memory cells. 4,710,897, Cl. 365-182.000.
Matejczyk, Daniel E., to Rockwell International Corporation. Infiltrated sintered articles. 4,710,223, Cl. 75-248.000.
Matra: *See—*
Boggero, Henri, 4,709,637, Cl. 102-481.000.
Doittau, Pierre O.; and Moal, Herve , 4,710,645, Cl. 307-115.000.
Matsubara, Toshiaki: *See—*
Suzuki, Yasunaga; Matsubara, Toshiaki; and Uragami, Akira, 4,710,842, Cl. 361-88.000.
Matsuda, Katsumi; and Kono, Kunio, to Mitsubishi Jukogyo Kabushiki Kaisha. High-speed wrapping machine. 4,709,529, Cl. 53-207.000.
Matsuda, Kenji: *See—*
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
Matsuda, Shigeyoshi: *See—*
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.
Matsuda, Yoshio, to Yoshida Kogyo K. K. Warp-knit support tape for hook and loop fasteners. 4,709,562, Cl. 66-193.000.
Matsui, Minoru; and Tsuno, Nobuo, to NGK Insulators, Ltd. Internal combustion engine piston and a method of producing the same. 4,709,621, Cl. 92-212.000.
Matsui, Toshiyuki, to Kabushiki Kaisha Kenwood. Signal control apparatus. 4,710,962, Cl. 381-102.000.
Matsukas, George A.: *See—*
Passarelli, Frank J.; Matsukas, George A.; and Caspary, Charles P., 4,710,272, Cl. 202-205.000.
Matsuki, Seiichiro: *See—*
Yamada, Fumiya; Matsuki, Seiichiro; Kawamura, Masahiko; and Kawamoto, Masashi, 4,710,835, Cl. 360-106.000.
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, to Hitachi Maxell, Ltd. Recording disc cartridge. 4,709,816, Cl. 206-444.000.
Matsumoto, Junichiro: *See—*
Shimada, Mitsuhiro; Matsumoto, Junichiro; Nonaka, Susumu; and Sayama, Haruo, 4,710,041, Cl. 400-120.000.
Matsumoto, Kozo: *See—*
Nakamura, Junji; Nishimura, Ikuma; Saito, Goro; and Matsumoto, Kozo, 4,710,436, Cl. 429-41.000.
Matsumoto, Motoki: *See—*
Nakamura, Kazuharu; Matsumoto, Motoki; Kondo, Akinobu; and Ito, Kiyonobu, 4,710,125, Cl. 431-22.000.
Matsumoto, Noboru: *See—*
Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, 4,710,509, Cl. 514-384.000.
Matsumoto, Takashi, to Fuji Photo Film Co., Ltd. Magnetic head device including magnetic media biasing and positioning means. 4,710,837, Cl. 360-110.000.
Matsumoto, Yutaka; Mina, Cesar; Russell, Philip B.; and van Ark, William B., to United States of America, National Aeronautics and Space Administration. Airborne tracking sunphotometer apparatus and system. 4,710,618, Cl. 250-203.00R.
Matsunawa, Masahiko, to Konishiroku Photo Industry Co., Ltd. Image processing method. 4,710,822, Cl. 358-280.000.
Matsuo, Kazuhiro: *See—*
Ishikawa, Tadashi; Matsuo, Kazuhiro; and Hoshi, Akimitsu, 4,709,915, Cl. 271-288.000.
Matsuoka, Fumio: *See—*
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
Matsuoka, Hiroshi; and Onoe, Susumu, to Bando Chemical Industries, Lt. Belt. 4,710,155, Cl. 474-260.000.
Matsushima, Masaaki: *See—*
Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, 4,710,418, Cl. 428-192.000.
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, to Hitachi Maxell, Ltd. Optical recording disc. 4,710,913, Cl. 369-280.000.
Matsushiro, Hiroyuki: *See—*
Takeda, Fuchio; Matsushiro, Hiroyuki; Kobayashi, Kazuo; and Kaneko, Toshio, 4,710,015, Cl. 355-3.0DD.
Matsushita Electric Industrial Co., Ltd.: *See—*
Neki, Shigeo; Ohara, Kenichi; Shibata, Nobuho; and Dohi, Takashi, 4,710,688, Cl. 318-603.000.
Ookubo, Hiroaki, 4,710,046, Cl. 400-556.200.
Shibata, Jun; and Serizawa, Hiroyuki, 4,710,936, Cl. 372-45.000.
Takagi, Yoshiyuki; and Kaneaki, Tetsuhiko, 4,709,611, Cl. 84-1.220.
Yamada, Noboru; Nagashima, Michiyoshi; and Nishiuchi, Kenichi, 4,710,911, Cl. 369-100.000.
Matsushita Electric Works, Ltd.: *See—*
Yamada, Satoshi; and Furukawa, Kaoru, 4,710,695, Cl. 320-21.000.
Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; and Okumura, Shinichi, to Nishiyodo Air Conditioner Co., Ltd. Adsorption refrigerating apparatus. 4,709,558, Cl. 62-480.000.
Matsushita, Tsuyoshi, to Tokyo Electric Co., Ltd. Impact printer with variable delay for print cycle based on different print-hammer energy levels. 4,710,043, Cl. 400-144.200.
Matsuta, Shigetoshi, to Alps Electric, Ltd. Band switching circuit tuner. 4,710,737, Cl. 334-56.000.
Matsuura, Hitoshi; and Sakurai, Hiroshi, to Fanuc Ltd. Arbitrary-direction tracer control unit. 4,709,482, Cl. 33-1.00M.
Matsuura, Toshihiro, to Kabushiki Kaisha Toshiba. Multi-stage turbine. 4,710,099, Cl. 415-199.500.
Matsuyama, Shigeru; Kanazaki, Mikio; Aoki, Norio; and Ishii, Akira, to Hitachi, Ltd.; and Hitachi Device Engineering Co., Ltd. Liquid

crystal color display device having plural color filters per segment electrode. 4,709,993, Cl. 350-339.00F.

Matsuzaka, Syoji: *See—*
Hirabayashi, Shigeto; Matsuzaka, Syoji; Ohya, Yukio; and Nonaka, Yoshiyuki, 4,710,453, Cl. 430-505.000.

Mattei, Riccardo; and Minarelli, Alessandro, to G. D. Societa Per Azioni. Device for the application of an adhesive to one or more localized areas of a sheet of flexible wrapping material. 4,710,257, Cl. 156-578.000.

Maurice, Claude G.: *See—*
Kortschinski, Juri; Lat, Michael V.; Maurice, Claude G.; and Tickner, Derek C., 4,710,847, Cl. 361-125.000.

Mauro, Alex: *See—*
Stern, Howard; Mauro, Alex; and Lee, Jay, 4,709,858, Cl. 239-296.000.

Maus, Louis: *See—*
Warren, Leslie F., Jr.; Maus, Louis; and Hall, William F., 4,710,401, Cl. 427-121.000.

Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.: *See—*
Schlechtriemen, Gerhard-Ludwig; Hotzel, Gerhard; and Weppner, Werner, 4,710,848, Cl. 361-280.000.

Maxa, Jaroslav: *See—*
Curda, Otakar; Maxa, Jaroslav; and Uhlir, Pavel, 4,710,646, Cl. 307-116.000.

Maxwell, Dennis L.: *See—*
Quante, Jeffrey B., III; Scoggin, Steven C.; Maxwell, Dennis L.; Rosenkoetter, Marvin W.; and Ferencik, James J., 4,709,659, Cl. 109-21.500.

Mayer, Edward F.: *See—*
Koelling, Alan L.; Murphy, William J.; and Mayer, Edward F., 4,710,442, Cl. 430-85.000.

Mayer, Patricia: *See—*
Lee, Duk-Hi; Feierberg, Susan E.; and Mayer, Patricia, 4,710,319, Cl. 252-646.000.

Mayes, David G., to Helena Laboratories Corporation. Container for an electrophoretic support medium. 4,709,810, Cl. 206-205.000.

Mayfield, Ross: *See—*
Jenkins, Stuart M.; Spencer, Michael S.; and Mayfield, Ross, 4,709,820, Cl. 209-534.000.

Mayle, Johnny D., Jr. Waste bag. 4,709,661, Cl. 119-95.000.

Mayo Foundation: *See—*
Lazarow, Normand H.; and Bove, Alfred A., 4,709,703, Cl. 128-654.000.

Mayo Medical Resources: *See—*
Gleich, Gerald J.; and Wasmoen, Terri L., 4,710,475, Cl. 436-86.000.

Mayr, Ernst: *See—*
Oestreich, Ulrich; and Mayr, Ernst, 4,709,984, Cl. 350-96.230.

Mazda Motor Corporation: *See—*
Boda, Keiji; Waki, Kouichirou; and Yanagisawa, Keizo, 4,709,596, Cl. 74-868.000.
Hayama, Mamoru, 4,709,595, Cl. 74-864.000.
Ohya, Takegi, 4,709,957, Cl. 296-146.000.
Watanabe, Kenichi; Hiruta, Hideshi; and Hiketa, Manabu, 4,709,775, Cl. 180-233.000.
Yoshimura, Toshiteru; Kobayashi, Takayuki; and Ono, Masayoshi, 4,709,943, Cl. 280-751.000.

Maze, Etienne G.: *See—*
Guioth, Chantal H.; Maze, Etienne G.; and Rabajoie, Loick P., 4,710,281, Cl. 204-181.700.

McAbee, Mac P.; and Biddle, Deloss J., to McAbee, Mac Patrick. Distributor for multi-cylinder engine. 4,710,598, Cl. 200-21.000.

McAbee, Mac Patrick: *See—*
McAbee, Mac P.; and Biddle, Deloss J., 4,710,598, Cl. 200-21.000.

McAlpin, James J.; and Chow, Wai Y., to Exxon Chemical Patents Inc. Composition for preparing cement-adhesive reinforcing fibers. 4,710,540, Cl. 525-101.000.

McCandless, Brian E.; and Birkmire, Robert W., to University of Delaware, The. Process for fabricating thin film photovoltaic solar cells. 4,709,466, Cl. 437-5.000.

McCluer, Robert: *See—*
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,710,490, Cl. 514-25.000.

McCorquodale Machine Systems Limited: *See—*
Wilkins, David R. G.; Brooker, Reginald D.; Walker, Roger; and Powell, Harry, 4,709,630, Cl. 101-93.220.

McCutcheon, Samuel; Lum, Jeffrey; Solek, Roman; Harrell, Troy; and Leman, Robert, to Autek Systems Corporation. High speed instrument bus. 4,710,893, Cl. 364-900.000.

McDonough, Paul J.: *See—*
Vietrogoski, Charles J.; Obarowski, Richard; and McDonough, Paul J., 4,709,608, Cl. 83-355.000.

McEvoy, Thomas J.: *See—*
McNeil, Charles B.; and McEvoy, Thomas J., 4,710,165, Cl. 604-67.000.

McFarlane, Richard H. Flashback structure. 4,710,173, Cl. 604-168.000.

McGinley, John V. M., to Picker International Ltd. Electromagnet arrangements for producing a magnetic field of high homogenity. 4,710,741, Cl. 335-296.000.

McGregor, William H.; and Chang, Joseph Y., to American Home Products Corporation. 2-[1,3,2-dioxaphospholan-2-yloxy]ethyl compounds. 4,710,580, Cl. 558-86.000.

McGuire, Bernie; Innes, Robert S.; and Pagowski, Stefan, to Canadian Bird Equipment Limited. Hock cutting mechanism. 4,709,448, Cl. 17-11.000.

McKee, Bobby D.; Cain, Michael P.; Delvecchio, Robert M.; and Aivaliotis, Emmanuel, to Westinghouse Electric Corp. Solenoidal homopolar generator. 4,710,660, Cl. 310-178.000.

McKee, Bobby D.: *See—*
Kilgore, Lee A.; and McKee, Bobby D., 4,710,665, Cl. 310-219.000.
Rindal, Roald A.; and McKee, Bobby D., 4,710,666, Cl. 310-248.000.

McNeil, Charles B.; and McEvoy, Thomas J. Wearable, variable rate suction/collection device. 4,710,165, Cl. 604-67.000.

McNeil, John R. Optical scatterometer having improved sensitivity and bandwidth. 4,710,642, Cl. 250-571.000.

McQueen, Robert. Crawling insect trap. 4,709,503, Cl. 43-114.000.

Meade, Steven L.: *See—*
Morris, Merle E.; Rice, Lawrence M.; and Meade, Steven L., 4,710,676, Cl. 313-579.000.

Mechanical Technology Incorporated: *See—*
Hoogenboom, Leo; Jackson, Robert L., Jr.; Kraft, Russell P.; and Offt, Alan M., 4,710,808, Cl. 358-107.000.

Medical Research & Development Associates: *See—*
Weber, Raviv, 4,709,701, Cl. 128-422.000.

Medtech Diagnostics Inc.: *See—*
Truglio, Diana, 4,709,705, Cl. 128-750.000.

Mee, Gary L.; and Willcott, M. Robert, to NMR Imaging, Inc. Method of mapping magnetic field strength and tipping pulse accuracy of an NMR imager. 4,710,715, Cl. 324-307.000.

Meier, Friedrich: *See—*
Altmeyer, Werner; Jakobs, Ewald; and Meier, Friedrich, 4,710,078, Cl. 409-233.000.

Meier, Helmut-Martin; Heine, Hans-Georg; Pischtschan, Alfred; Dhein, Rolf; and Rudolph, Hans, to Bayer Aktiengesellschaft. Stabilized thermoplastic moulding materials based on ABS polymers and acyl phosphanoxides. 4,710,529, Cl. 524-139.000.

Meier, Konrad, to Siemens Aktiengesellschaft. Method and apparatus for fabricating a curved magnet coil. 4,709,470, Cl. 29-605.000.

Meier, Walter: *See—*
Muller, Kurt; and Meier, Walter, 4,710,629, Cl. 250-342.000.

Meister, Alton, to Cornell Research Foundation, Inc. Glutathione delivery system. 4,710,489, Cl. 514-18.000.

Melkunte Holland B.V.: *See—*
Uiterwaal, Dirk J. D.; and Hersevoort, Aart, 4,710,387, Cl. 426-72.000.

Menzemer, Craig C.: *See—*
Stemler, J. Robert; Klingensmith, James D.; Menzemer, Craig C.; Kulicki, John M.; and Theofanis, Nicholas D., 4,709,435, Cl. 14-73.000.

Merck & Co., Inc.: *See—*
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., 4,710,504, Cl. 514-267.000.
Erdman, George R., 4,709,837, Cl. 222-636.000.
Liang, Theming; and Slater, Eve E., 4,710,469, Cl. 435-194.000.
Willard, Alvin K.; Novello, Frederick C.; Hoffman, William F.; and Cragoe, Edward J., Jr., 4,710,513, Cl. 514-460.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
Schad, Hans P.; and Kelly, Stephen M., 4,710,315, Cl. 252-299.630.
Wermuth, Stefan; Hauke, Gunter; and Kreher, Klaus, 4,710,289, Cl. 210-198.200.

Meredith, William A.: *See—*
Slater, Daniel A.; Meredith, William A.; and Devaney, Mark J., 4,710,352, Cl. 422-63.000.

Merkus, Minne, to Robert Bosch GmbH. Apparatus for producing bag packages having dispensing fitments. 4,709,528, Cl. 53-128.000.

Merle, Jean-Pierre: *See—*
Grenier, Gilles; Maffert, Jerome; Merle, Jean-Pierre; and des Ordons, Jacques R., 4,710,028, Cl. 356-375.000.

Merlin Gerin: *See—*
Neel, Jean-Philippe; Case, Roger; and Garnier, Gilbert, 4,710,738, Cl. 335-172.000.

Merlin Gerin S.A.: *See—*
Demeyer, Pierre, 4,710,845, Cl. 361-96.000.

Merrifield, Charles H.: *See—*
Balke, Roy L.; Merrifield, Charles H.; and Mizikowski, Frank E., 4,710,662, Cl. 310-204.000.

Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, to Boehringer Mannheim GmbH. Pyrrolobenzimidazoles, pharmaceutical compositions containing them, and use of them to treat certain heart and circulatory diseases. 4,710,510, Cl. 514-394.000.

Merz, Johann, to Zahnradfabrik Friedrichshafen, Ag. Regulatable fan drive. 4,709,666, Cl. 123-41.120.

Messerli, Alan J.: *See—*
Scott, Graham A.; and Messerli, Alan J., 4,710,844, Cl. 361-96.000.

Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See—*
Haberl, Fritz, 4,710,619, Cl. 250-203.00R.
Wagenknecht, Juergen; and Raedisch, Dieter, 4,709,843, Cl. 227-156.000.

Messerschmitt-Bolkow-Blohm GmbH: *See—*
Kunkel, Bernd, 4,710,620, Cl. 250-203.00R.

Meszaros, Judit: *See—*
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Metallgesellschaft Aktiengesellschaft: *See—*
Batza, Willi; and Rosch, Werner, 4,710,203, Cl. 55-2.000.

Metz, Hans J., to Hoechst Aktiengesellschaft. Process for the preparation of alkali metal and alkaline earth salts of benzaldehyde-2,4-di-sulfonic acid. 4,710,322, Cl. 260-511.000.

Metz, Marcus C., to Chrysler Motors Corporation. Automatic power door lock system. 4,709,776, Cl. 180-281.000.

Metz, Marcus C., to Chrysler Motors Corporation. Vehicle power door locks, ignition key interlock system therefor. 4,709,777, Cl. 180-286.000.

Meurer Druck & Carton GmbH: *See*—
Vossen, Franz, 4,710,156, Cl. 493-1.000.

Meyers, Peter V.; Liu, Chung-Heng; and Frey, Timothy J., to Ametek, Inc. Heterojunction p-i-n photovoltaic cell. 4,710,589, Cl. 136-258.0PC.

Meyers, Thomas J., to NCR Corporation. CCD bar code scanner. 4,710,615, Cl. 235-454.000.

Michael, Mark S.; and Glaze, Scott A., to Fort Wayne Metals Research Products Corporation. Surgeon's Gigli saw and method. 4,709,699, Cl. 128-317.000.

Michelson, Paul E. Fluid lens. 4,709,996, Cl. 350-418.000.

Michishige, Toru: *See*—
Nakama, Katsuhiko; Ninomiya, Hiroshi; Michishige, Toru; and Itsuki, Fumiaki, 4,709,976, Cl. 439-350.000.

Micro-Mega S.A.: *See*—
Henri, Leonard; and Seigneurin, Michel, 4,710,178, Cl. 604-209.000.

Microbial Chemistry Research Foundation: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.

Midland Brake, Inc.: *See*—
Soupal, Thomas R., 4,710,108, Cl. 417-298.000.

Mielke, Siegfried, to Kolbenschmidt AG. Piston and connecting rod assembly. 4,709,620, Cl. 92-187.000.

Mierbach, Hans-Bernd; Frohn, Gustav K.; and Blockisch, Olaf, to Applied Power, Inc. Power screw driver with a ratchet wheel having finely graduated toothing. 4,709,600, Cl. 81-57.390.

Mikula, George: *See*—
Jacklich, John; and Mikula, George, 4,710,172, Cl. 604-118.000.

Mikuni Kogyo Kabushiki Kaisha: *See*—
Muraji, Tetsuo, 4,709,677, Cl. 123-438.000.

Miles Laboratories, Inc.: *See*—
Wogoman, Frank W., 4,710,351, Cl. 422-50.000.

Milewits, Marvin: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Milholland, Marvin L.: *See*—
Fluck, Sydney, Jr.; and Milholland, Marvin L., 4,710,969, Cl. 455-67.000.

Miller, Cardell E.: *See*—
Waldo, Russell W.; and Miller, Cardell E., 4,709,445, Cl. 16-300.000.

Miller, Dennis C., to American Sprayed-On Fibers, Inc. Lightweight soundproofing, insulation and fireproofing material and method. 4,710,309, Cl. 252-62.000.

Miller, John A.: *See*—
Wood, Leigh E.; Miller, John A.; and Sipinen, Alan J., 4,710,190, Cl. 604-389.000.

Miller, Michael J., to Integrated Device Technology, Inc. Diagnostic circuit. 4,710,927, Cl. 371-15.000.

Miller, Ray R., to Miller, Ray R.; and Weyerhaeuser Co., a part interest. Belt and drum-type press. 4,710,271, Cl. 162-360.100.

Miller, Stephen J., to Chevron Research Company. Paraffin isomerization catalyst. 4,710,485, Cl. 502-213.000.

Mills, Borden H., to Eastman Kodak Company. Process control for electrostatographic machine. 4,710,785, Cl. 346-153.100.

Mills, Russell C.; and Jager, Stewart C. Game board. 4,709,929, Cl. 273-402.000.

Milsco Manufacturing Company: *See*—
Hill, Kevin E., 4,709,961, Cl. 297-284.000.
Uecker, Ronald T.; and Slicker, Steven D., 4,709,963, Cl. 297-316.000.

Mina, Cesar: *See*—
Matsumoto, Yutaka; Mina, Cesar; Russell, Philip B.; and van Ark, William B., 4,710,618, Cl. 250-203.00R.

Minami, Saburo, to Osaka Kanagu Co., Ltd. Digital lock. 4,709,564, Cl. 70-25.000.

Minami, Takao: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Minarelli, Alessandro: *See*—
Mattei, Riccardo; and Minarelli, Alessandro, 4,710,257, Cl. 156-578.000.

Minigrip, Inc.: *See*—
Ausnit, Steven, 4,709,533, Cl. 53-451.000.

Ministry of International Trade & Industry: *See*—
Nakano, Kikuo; and Hayashi, Hiroshi, 4,710,435, Cl. 428-698.000.

Minnesota Mining and Manufacturing Company: *See*—
Ellis, Arthur B.; and van Ryswyk, Hal, 4,710,476, Cl. 436-172.000.
Klingen, Jurgen; and Zimmerman, Patrick G., 4,710,536, Cl. 524-493.000.
Krause, Larry J.; and Rider, Jack A., 4,710,403, Cl. 427-304.000.
Montean, Samuel, 4,710,754, Cl. 340-572.000.
Northrup, Walter E.; and Freeman, Maurice E., 4,710,414, Cl. 428-43.000.
Sanders, James F., 4,710,445, Cl. 430-252.000.
Thien, Tran V., 4,710,570, Cl. 544-31.000.
Verhaagen, Ronald J., 4,710,004, Cl. 353-81.000.
Wildt, Theodor N., 4,709,813, Cl. 206-312.000.
Wood, Leigh E.; Miller, John A.; and Sipinen, Alan J., 4,710,190, Cl. 604-389.000.

Mioen, Thomas K.: *See*—
Dyvik, Froystein; and Mioen, Thomas K., 4,710,277, Cl. 204-119.000.

Misco, Peter F., Jr.: *See*—
Kim, Choung Un.; and Misco, Peter F., Jr., 4,710,568, Cl. 540-350.000.

Mishler, Jack L. Storage apparatus for hitch and hitch torsion bars when not in use. 4,709,940, Cl. 280-405.00R.

Missert, William: *See*—
Bellavia, William D.; and Missert, William, 4,710,127, Cl. 433-215.000.

Mita Industrial Co., Ltd.: *See*—
Watanabe, Toshio; Tsutsui, Eiji; and Tsunoda, Arihiro, 4,710,017, Cl. 355-8.000.

Mitchell, Christopher: *See*—
Markle, Wilson; and Mitchell, Christopher, 4,710,805, Cl. 358-81.000.

Mitchell, Terry L.; and Poortvliet, Robert J., to Architectural Wall Systems, Inc. Floor-to-ceiling wall system. 4,709,517, Cl. 52-36.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Asaeda, Takeaki, 4,710,862, Cl. 363-58.000.
Furutani, Kiyohiro; Mashiko, Koichiro; and Arimoto, Kazutami, 4,710,789, Cl. 357-23.600.
Hasegawa, Tadashi, 4,710,833, Cl. 360-105.000.
Hirao, Tadashi, 4,709,469, Cl. 437-63.000.
Imai, Hiroshi; and Yoshioka, Kouichi, 4,710,830, Cl. 360-97.000.
Kumanoya, Masaki; Fujishima, Kazuyasu; and Dosaka, Katsumi, 4,710,901, Cl. 365-190.000.
Mizohata, Fumio; and Kawabata, Takao, 4,710,696, Cl. 323-223.000.
Murakami, Tokumichi; Itoh, Atsushi; Asai, Kohtaro; Kamizawa, Koh; and Nishida, Masami, 4,710,812, Cl. 358-136.000.
Okamoto, Tatsuo; Eguchi, Kouji; and Oosaki, Saburou, 4,710,790, Cl. 357-23.600.
Oomori, Tatsuo; Ono, Kouichi; and Fujita, Shigeto, 4,710,937, Cl. 372-53.000.
Suzuki, Masanori, 4,710,792, Cl. 357-38.000.
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
Wakamiya, Yoshinori; and Sumino, Tomoko, 4,709,570, Cl. 72-365.000.

Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Matsuda, Katsumi; and Kono, Kunio, 4,709,529, Cl. 53-207.000.
Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, 4,710,255, Cl. 156-361.000.
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Mitsubishi Paper Mills, Ltd.: *See*—
Iguchi, Keisuke; and Ebato, Seigo, 4,710,455, Cl. 430-567.000.

Mitsubishi Rayon Co., Ltd.: *See*—
Murakami, Saburo; Kinashi, Shoji; and Ego, Toyokazu, 4,710,333, Cl. 264-73.000.

Mitsui Engineering & Shipbuilding Co., Ltd.: *See*—
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Miyaji, Takashi, to Sharp Kabushiki Kaisha. Variable magnification copying apparatus. 4,710,018, Cl. 355-8.000.

Miyajima, Nobuyuki; Hata, Kenji; and Nakayama, Junichi, to Lion Corporation; and Toyo Contact Lens Co., Ltd. Detergent composition for contact lenses. 4,710,313, Cl. 252-105.000.

Miyamoto, Isao: *See*—
Yamano, Shoji; and Miyamoto, Isao, 4,709,769, Cl. 177-1.000.

Miyamoto, Kiyoshi, to Omron Tateisi Electronics Co. Electronic switching device. 4,710,699, Cl. 323-324.000.

Miyamoto, Yasuo: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Miyao, Fumio, to Fuji Xerox Co., Ltd. Composite data transmission system. 4,710,918, Cl. 370-85.000.

Miyata, Shigeo, to Kyowa Chemical Industry Co., Ltd. Process for producing a vinyl chloride polymer or copolymer in aqueous suspension using a hydrotalcite compound as suspension stabilizer. 4,710,551, Cl. 526-91.000.

Miyata, Yoshiki: *See*—
Tomioka, Hisatsugu; Waki, Tatsuo; and Miyata, Yoshiki, 4,709,783, Cl. 182-8.000.

Mizelle, Ned W. Furniture seat supports and spring assemblies. 4,709,906, Cl. 267-103.000.

Mizikowski, Frank E.: *See*—
Balke, Roy L.; Merrifield, Charles H.; and Mizikowski, Frank E., 4,710,662, Cl. 310-204.000.

Mizobuchi, Shigeyuki: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.

Mizohata, Fumio; and Kawabata, Takao, to Mitsubishi Denki Kabushiki Kaisha. Control device for controllable electric valve. 4,710,696, Cl. 323-223.000.

Mizokami, Hiroshi: *See*—
Ohtomo, Nobuya; Mizuno, Kyosuke; Hamada, Fukusaburo; and Mizokami, Hiroshi, 4,710,378, Cl. 424-89.000.

Mizuno, Chiaki: *See*—
Ono, Toshio; Tamai, Yasuo; Mizuno, Chiaki; Ogawa, Hiroshi; and Saito, Shinji, 4,710,421, Cl. 428-213.000.

Mizuno, Kyosuke: *See*—
Ohtomo, Nobuya; Mizuno, Kyosuke; Hamada, Fukusaburo; and Mizokami, Hiroshi, 4,710,378, Cl. 424-89.000.

Mizushima, Kunio: *See*—
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, 4,709,816, Cl. 206-444.000.

Mizushima, Toyoshi: *See*—
Hayashi, Tadamasa; and Mizushima, Toyoshi, 4,710,266, Cl. 159-7.000.

Moake, Gordon L.: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Moal, Herve : *See*—
Doittau, Pierre O.; and Moal, Herve , 4,710,645, Cl. 307-115.000.

Mobil Oil Corporation: *See*—
Bowman, Donald E., 4,709,485, Cl. 33-228.000.
Huggard, Mark T., 4,710,522, Cl. 521-138.000.

Mocker, Wolfgang: *See*—
Klug, Horst; Mocker, Wolfgang; Schaeffler, George; and Speil, Walter, 4,709,668, Cl. 123-90.550.

Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., to Surgical Engineering Associates, Inc. Implantable infusion port. 4,710,174, Cl. 604-175.000.

Moden, Robert D.: *See*—
Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 4,710,174, Cl. 604-175.000.

Modster, Rudolph W.: *See*—
Rowe, James M.; and Modster, Rudolph W., 4,710,433, Cl. 428-623.000.

Mohri, Kunihiko: *See*—
Takasuka, Yutaka; Mohri, Kunihiko; and Kawaguchi, Akiko, 4,710,375, Cl. 424-69.000.

Molnar, Attila: *See*—
Vertesi, Csaba; Molnar, Attila; and Guczoghy, Lajos, 4,710,578, Cl. 558-4.000.

Molnlycke AB: *See*—
Runeman, Bo, 4,710,188, Cl. 604-385.00R.

Molyneux, Jeffrey P.: *See*—
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., 4,709,948, Cl. 285-381.000.

Momot, Stanley; and Hannon, William G., to Rockwell International Corporation. Plate cylinder register control. 4,709,634, Cl. 101-248.000.

Monaghan, Michael L., to Ricardo Consulting Engineers plc. Fuel supply system for turbocharged internal combustion engine. 4,709,676, Cl. 123-383.000.

Monnerat, Georgia A.: *See*—
Bogan, Gary W.; Lucas, Peter A.; Monnerat, Georgia A.; and Aldrich, Dale J., 4,710,429, Cl. 428-417.000.

Mono Power Co.: *See*—
Wong, Morton M.; and Shugarman, Arnold L., 4,710,367, Cl. 423-335.000.

Monsanto Company: *See*—
Kraus, Menahem A.; and Murphy, Milton K., 4,710,204, Cl. 55-16.000.

Monsell, Kurt: *See*—
Sutphin, Richard C.; Bell, Steven R.; and Monsell, Kurt, 4,710,694, Cl. 320-21.000.

Montean, Samuel, to Minnesota Mining and Manufacturing Company. Magnetic marker having switching section for use in electronic article surveillance systems. 4,710,754, Cl. 340-572.000.

Montedison S.p.A.: *See*—
Credali, Lino; Corsi, Gianfranco; and Chiolle, Antonio, 4,710,336, Cl. 264-171.000.

Montgomery, Robert R.: *See*—
Kunicki, Thomas J.; and Montgomery, Robert R., 4,710,381, Cl. 424-101.000.

Mooney, Paul C., to Quick-Set, Incorporated. Surveillance camera mount. 4,709,897, Cl. 248-551.000.

Mooney, Thomas E.: *See*—
Pierson, Karl B.; Mooney, Thomas E.; and Jones, William G., 4,709,901, Cl. 251-58.000.

Moore Business Forms, Inc.: *See*—
Wagner, David G., 4,709,850, Cl. 229-73.000.

Moore, Carl F. Lantern holder. 4,709,890, Cl. 248-205.100.

Moore, Milton D. Shaving tool. 4,709,481, Cl. 30-356.000.

Moore, Thomas C.: *See*—
Rorden, Louis H.; and Moore, Thomas C., 4,710,708, Cl. 324-207.000.

Moore, William A.: *See*—
Stevens, Leonard W.; Siwik, William S.; Moore, William A.; Brown, Wayne M.; and Barnard, Andrew A., 4,709,545, Cl. 60-39.080.

Moos, Walter H.: *See*—
Bergmeier, Stephen C.; Downs, David A.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,710,508, Cl. 514-357.000.

Morehouse Industries, Inc.: *See*—
Szkaradek, Edward J.; and Corrigan, John J., 4,709,863, Cl. 241-69.000.

Moreland, David W.: *See*—
Bergmeier, Stephen C.; Downs, David A.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,710,508, Cl. 514-357.000.

Morell, Joseph; De Marchi, Jean-Louis; and Kopp, Norbert, to Salomon S.A. Alpine ski boot. 4,709,491, Cl. 36-121.000.

Moreno, Frederick E.; and Hartman, Creighton D., to PruTech II. Primary stage combustor lining. 4,709,643, Cl. 110-336.000.

Morflex Chemical Company, Inc.: *See*—
Hull, Ezekiel H.; and Frappier, Edward P., 4,710,532, Cl. 524-310.000.

Morgan, Charles R.: *See*—
Siadat, Bahram; and Morgan, Charles R., 4,710,539, Cl. 525-59.000.

Mori, Kei. Connecting structure for connecting optical conductors. 4,709,981, Cl. 350-96.210.

Mori, Kei. Light radiator. 4,709,999, Cl. 350-486.000.

Mori, Masakazu: *See*—
Soeda, Kazuhiko; Mori, Masakazu; Nishikawa, Tsutomu; and Tomimori, Kiyoshi, 4,710,022, Cl. 356-73.100.

Moriguchi, Koichi: *See*—
Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, 4,710,166, Cl. 417-213.000.

Morino, Yuichi: *See*—
Motodate, Shoji; Morino, Yuichi; and Kurata, Norihiro, 4,710,599, Cl. 200-61.850.

Morishima, Yasuo: *See*—
Dupont, Bo; Morishima, Yasuo; Collins, Nancy; Ogata, Shunichiro; and Lloyd, Kenneth O., 4,710,457, Cl. 435-7.000.

Morita, Masahiko: *See*—
Tosaka, Akio; Hashiguchi, Koichi; Morita, Masahiko; and Okano, Shinobu, 4,709,557, Cl. 62-373.000.

Morita, Yoshitaka: *See*—
Suzuki, Mitsutoshi; Morita, Yoshitaka; Okada, Masami; and Shimohara, Jun, 4,710,297, Cl. 210-493.200.

Moritz, Manfred; and Rettke, Wilfried, to Ta Triumph-Adler Aktiengesellschaft. Method and apparatus for indexing the print hammer of typewriters or the like. 4,710,042, Cl. 400-141.000.

Moriya, Koichi: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Kagabu, Shinzo; Sakawa, Shinji; and Moriya, Koichi, 4,710,518, Cl. 514-624.000.

Moroi, Shiro: *See*—
Kita, Yasushi; and Moroi, Shiro, 4,710,335, Cl. 264-105.000.

Morris, Charles F., to Amgen, Inc. DNA plasmids. 4,710,473, Cl. 435-320.000.

Morris, Merle E.; Rice, Lawrence M.; and Meade, Steven L., to GTE Products Corporation. Multi-level fuser lamp. 4,710,676, Cl. 313-579.000.

Morrison, Bertram L., to Vetco Gray, Inc. Metal-to-metal seal structure. 4,709,725, Cl. 137-614.040.

Morrison, Howard J.: *See*—
Breslow, Jeffrey D.; Morrison, Howard J.; Hanson, Steven P.; and Rasmussen, Russell G., 4,710,873, Cl. 364-410.000.

Mortensen, Roger; and Gregerson, Barry, to Empak Inc. Storage box. 4,709,834, Cl. 220-326.000.

Morton, Bruce L.: *See*—
Pelley, Perry H., III; and Morton, Bruce L., 4,710,902, Cl. 365-222.000.

Moscovitch, Jerry N.: *See*—
Ward, Douglas K.; and Moscovitch, Jerry N., 4,709,938, Cl. 280-154.50R.

Motodate, Shoji; Morino, Yuichi; and Kurata, Norihiro, to Honda Giken Kogyo Kabushiki Kaisha. Switch attachment structure for use on motor vehicles with handlebars. 4,710,599, Cl. 200-61.850.

Motomura, Masatoshi: *See*—
Okoshi, Noboru; Motomura, Masatoshi; Ohtsubo, Mitsuru; and Ikeda, Takenori, 4,710,230, Cl. 106-308.00N.

Motoren-und Turbinen-Union Munchen, GmbH: *See*—
Rossman, Axel, 4,710,346, Cl. 419-68.000.

Motorola, Inc.: *See*—
Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., 4,710,945, Cl. 375-100.000.
Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., 4,710,957, Cl. 380-42.000.
Connell, Lawrence E.; and Webb, Ronald J., 4,710,724, Cl. 330-9.000.
Davis, William F., 4,710,728, Cl. 330-252.000.
Doyle, Joseph E., III, 4,710,730, Cl. 331-116.0FE.
Gray, Randall C., 4,710,793, Cl. 357-44.000.
Ocken, Alfred G.; and Nordbrock, Raymond E., 4,710,657, Cl. 310-62.000.
Pelley, Perry H., III; and Morton, Bruce L., 4,710,902, Cl. 365-222.000.
Swapp, Mavin C.; and Frisbie, Milo W., 4,709,801, Cl. 198-464.200.

Zolnowsky, John; Crudele, Lester M.; and Spak, Michael E., 4,710,866, Cl. 364-200.000.

Mouchotte, Daniel G. E., to Cimsa Sintra (S.A.). Method of protecting security documents. 4,710,617, Cl. 235-487.000.

Mouri, Yasunori; and Sugiura, Noboru, to Hitachi, Ltd. Knock control apparatus for internal combustion engine. 4,710,881, Cl. 364-431.080.

Moutardier, Jacques, to Aerospatiale Societe Nationale Industrielle. Spring-driven gyroscope. 4,709,586, Cl. 74-5.120.

MTU Motoren-und Turbinen-Union GmbH: *See*—
Weiler, Wolfgang, 4,709,546, Cl. 60-39.290.

Mucha, Lawrence S.: *See*—
Kruger, Manfred; and Mucha, Lawrence S., 4,709,835, Cl. 222-87.000.

Mueller, Dietmar; and Reinelt, Karlheinz, to Rheinmetall GmbH. Propellant charge casing. 4,709,636, Cl. 102-431.000.

Mulder, Douglas C., to Nordson Corporation. Sieve for powder. 4,710,286, Cl. 209-250.000.

Muller-Beckmann, Bernd: *See*—
Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, 4,710,510, Cl. 514-394.000.

Muller, George H., to Berke, Joseph J., a part interest. Tissue pneumatic separator structure and method. 4,709,697, Cl. 128-303.00R.

Muller, Karl H.; and Barthel, Walter, to Degussa Aktiengesellschaft. Powdered bitumen concentrate and its use. 4,710,229, Cl. 106-281.00R.

Muller, Kurt; and Meier, Walter, to Cerberus AG. Infrared intrusion detector. 4,710,629, Cl. 250-342.000.

Muller, Manfred: *See*—
Henne, Heinrich; Patzelt, Norbert; Schneider, Lutz T.; Knobloch, Osbert; and Muller, Manfred, 4,709,864, Cl. 241-167.000.

Mumford, George V., to Owens-Illinois Closure Inc. Press-on twist-off closure for container. 4,709,825, Cl. 215-318.000.

Mund, Konrad: *See*—
Hohmann, Eugen; Mund, Konrad; and Weidlich, Erhard, 4,710,233, Cl. 134-1.000.

Muraji, Tetsuo, to Mikuni Kogyo Kabushiki Kaisha. Fuel control system for air-fuel mixture supply devices. 4,709,677, Cl. 123-438.000.

Murakami, Hideo, to Ryobi, Ltd. Clutch mechanism for a fishing reel. 4,709,874, Cl. 242-220.000.

Murakami, Saburo; Kinashi, Shoji; and Ego, Toyokazu, to Mitsubishi Rayon Co., Ltd. Process for continuous preparation of synthetic resin plates having irregular flow pattern of different colors. 4,710,333, Cl. 264-73.000.

Murakami, Tokumichi; Itoh, Atsushi; Asai, Kohtaro; Kamizawa, Koh; and Nishida, Masami, to Mitsubishi Denki Kabushiki Kaisha. Inter-frame adaptive vector quantization encoding apparatus and video encoding transmission apparatus. 4,710,812, Cl. 358-136.000.

Murakami, Yuetsu: *See*—
Masumoto, Hakaru; and Murakami, Yuetsu, 4,710,243, Cl. 148-312.000.

Muralidhara, Ranya: *See*—
Pittet, Alan O.; Muralidhara, Ranya; and Hagedorn, Myrna L., 4,709,707, Cl. 131-276.000.

Murata Manufacturing Co., Ltd.: *See*—
Ogawa, Toshio, 4,710,311, Cl. 252-62.900.

Murata, Perry L.: *See*—
Harbolt, Bruce; Murata, Perry L.; and Burmaster, Neal C., 4,710,360, Cl. 422-269.000.

Murayama, Jin: *See*—
Suzuki, Kenji; Terashita, Takaaki; and Murayama, Jin, 4,710,803, Cl. 358-41.000.

Murchison, Charles W.: *See*—
Patrick, Keith H.; and Murchison, Charles W., 4,709,860, Cl. 239-654.000.

Murphy, Milton K.: *See*—
Kraus, Menahem A.; and Murphy, Milton K., 4,710,204, Cl. 55-16.000.

Murphy, William J.: *See*—
Koelling, Alan L.; Murphy, William J.; and Mayer, Edward F., 4,710,442, Cl. 430-85.000.

Murray, Kenneth, to Biogen N.V. Recombinant DNA molecules capable of expressing HBV core and surface antigens. 4,710,463, Cl. 435-68.000.

Muschner, Udo: *See*—
Winkelmann, Manfred; Muschner, Udo; and Gerber, Pierre, 4,709,905, Cl. 266-270.000.

Musschoot, Albert, to General Kinematics Corporation. Tumbling apparatus. 4,709,507, Cl. 51-7.000.

Mussler, James M.; and Swartz, Mark E., to Westinghouse Electric Corp. Automatic touch screen calibration method. 4,710,758, Cl. 340-712.000.

Myers, Daniel N.: *See*—
Cetinkaya, Ismail B.; and Myers, Daniel N., 4,710,357, Cl. 422-144.000.

Myers, William P., to Litton Systems, Inc. Fluidic oxygen sensor monitor. 4,709,575, Cl. 73-23.000.

Naaktgeboren, Adrianus; and Van Eecke, Roger H., to New Holland Inc. Bale accumulator. 4,710,086, Cl. 414-44.000.

Naaktgeboren, Adrianus; and Van Eecke, Roger H., to New Holland Inc. Bale accumulator and discharger. 4,710,087, Cl. 414-44.000.

Nagami, Akira, to NEC Corporation. Semiconductor memory having multiple access. 4,710,896, Cl. 365-149.000.

Nagano, Hiroo: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Nagaoka, Junichi, to Takara Co., Ltd. Toy vehicle assembly with multiple drive units. 4,710,148, Cl. 446-464.000.

Nagasawa, Kiyoshi: *See*—
Tokairin, Hiroaki; Honma, Kazuo; Nakajima, Kichio; Nagasawa, Kiyoshi; and Aritake, Takeshi, 4,710,884, Cl. 364-513.000.

Nagashima, Michiyoshi: *See*—
Yamada, Noboru; Nagashima, Michiyoshi; and Nishiuchi, Kenichi, 4,710,911, Cl. 369-100.000.

Nagle, Dennis C.: *See*—
Brupbacher, John M.; Christodoulou, Leontios; and Nagle, Dennis C., 4,710,348, Cl. 420-129.000.

Nagumo, Masahide, to Kabushiki Kaisha Toshiba. Control system for deinterleaving memories in digital audio reproducing apparatus. 4,710,923, Cl. 371-2.000.

Nahill, Thomas E.: *See*—
Krishnakumar, Suppayan M.; and Nahill, Thomas E., 4,710,118, Cl. 425-130.000.

Naito, Hideki, to Fuji Photo Film Co., Ltd. Photographic element comprising at least two exothermic electroconductive layers. 4,710,450, Cl. 430-351.000.

Nakagawa, Hideaki: *See*—
Ohkoshi, Akio; Tsuruta, Koji; Nakagawa, Hideaki; and Shimada, Satoshi, 4,710,765, Cl. 340-781.000.

Nakajima, Kichio: *See*—
Tokairin, Hiroaki; Honma, Kazuo; Nakajima, Kichio; Nagasawa, Kiyoshi; and Aritake, Takeshi, 4,710,884, Cl. 364-513.000.

Nakajima, Nobuyoshi; and Hishinuma, Kazuhiro, to Fuji Photo Film Co., Ltd. Alignment procedure for radiation images undergoing subtraction processing. 4,710,875, Cl. 364-414.000.

Nakajima, Shohachi: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.

Nakama, Katsuhiko; Ninomiya, Hiroshi; Michishige, Toru; and Itsuki, Fumiaki, to Omron Tateisi Electronics Co. Connector built from one or more single rowed housings with long lasting locking mechanism. 4,709,976, Cl. 439-350.000.

Nakamichi Corporation: *See*—
Kobayashi, Kozo; and Goto, Hideo, 4,710,907, Cl. 369-6.000.

Nakamura, Junji; Nishimura, Ikuma; Saito, Goro; and Matsumoto, Kozo, to Toppan Printing Co., Ltd; and Fuji Electric Co., Ltd. Molten carbonate fuel cell and method of manufacturing electrolyte plate thereof. 4,710,436, Cl. 429-41.000.

Nakamura, Kanehito: *See*—
Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, 4,710,106, Cl. 417-213.000.

Nakamura, Kazuharu; Matsumoto, Motoki; Kondo, Akinobu; and Ito, Kiyonobu, to Toyotomi Kogyo Co., Ltd. Safety device for oil burner. 4,710,125, Cl. 431-22.000.

Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, to Kao Corporation. Long wavelength ultraviolet ray absorber. 4,710,373, Cl. 424-59.000.

Nakamura, Kunie. Diagnostic applications of phosphofructokinase. 4,710,460, Cl. 435-15.000.

Nakamura, Seizo, to Ohara Co., Ltd. Mold material and process for casting of pure titanium or titanium alloy. 4,709,741, Cl. 164-35.000.

Nakamura, Takashi: *See*—
Hayashi, Seiichi; Nakamura, Takashi; and Tanabe, Hisayuki, 4,710,782, Cl. 346-76.00R.

Nakamura, Teruya: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,710,517, Cl. 514-616.000.

Nakamura, Yukitugu: *See*—
Masuda, Takashi; Nakamura, Yukitugu; and Sekiguchi, Kyoji, 4,710,003, Cl. 351-212.000.

Nakanishi, Keiichirou: *See*—
Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, 4,710,854, Cl. 361-414.000.

Nakano, Hiroki: *See*—
Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; and Okumura, Shin-ichi, 4,709,558, Cl. 62-480.000.

Nakano, Hitoshi: *See*—
Shimizu, Keiichi; Kikuchi, Sanae; and Nakano, Hitoshi, 4,709,931, Cl. 277-153.000.

Nakano, Kikuo; and Hayashi, Hiroshi, to Agency of Industrial Science & Technology; and Ministry of International Trade & Industry. Method for production of sintered composite having spinel reinforced with short fibers of silicon carbide and sintered composite produced by said method. 4,710,435, Cl. 428-698.000.

Nakatani, Hiroshi; Yoshida, Hirokazu; and Yamamura, Keiji, to Sharp Kabushiki Kaisha. Driver device mounting for a flat matrix display panel. 4,710,680, Cl. 315-169.400.

Nakayama, Junichi: *See*—
Miyajima, Nobuyuki; Hata, Kenji; and Nakayama, Junichi, 4,710,313, Cl. 252-105.000.

Nakayama, Tetsuroh, to Tokyo Electric Co., Ltd. Ink jet printing device. 4,710,784, Cl. 346-140.00R.

Nakazawa, Toshihiko: *See*—
Kuribayashi, Masaki; Nakazawa, Toshihiko; and Kanbe, Junichiro, 4,709,995, Cl. 350-350.00S.

Nalco Chemical Company: *See*—
Emmons, Daniel H., 4,710,303, Cl. 210-698.000.
Gross, Anthony E.; Christie, Richard D.; and Pinder, Thomas E., 4,710,285, Cl. 209-166.000.

Namai, Akihiro; Egawa, Akira; and Kodaira, Takanori, to Canon Kabushiki Kaisha. Lens barrel driving device for camera. 4,710,010, Cl. 354-400.000.

Naoi, Takashi; Fujioka, Takashi; Okamura, Hisashi; and Satake, Masaki, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,710,456, Cl. 430-564.000.

Narusch, Michael J., Jr. Dual basket small parts coating apparatus. 4,710,410, Cl. 427-430.100.

Nasby, Robert C.: *See*—
Stafford, Frank K.; and Nasby, Robert C., 4,710,064, Cl. 405-290.000.

National Starch and Chemical Corporation: *See*—
Tokumoto, Minoru; Takagi, Motoyuki; Shitaoka, Shizuo; Gold, Samuel; and Iovine, Carmine P., 4,710,526, Cl. 524-5.000.

National Transdata Systems, Inc.: *See*—
Utley, David L., 4,710,616, Cl. 235-472.000.

NCR Corporation: *See*—
Belknap, William M.; Chanasyk, Albert J.; O'Dell, Robert R.; and Girard, Donald J., 4,710,871, Cl. 364-200.000.
Grey, Michael O., 4,710,040, Cl. 400-55.000.
Meyers, Thomas J., 4,710,615, Cl. 235-454.000.
Reid, Bruce A.; and Deline, John R. M., 4,710,690, Cl. 318-685.000.

Nebco, Inc.: *See*—
Tucker, James L.; Landen, Terry R.; and Schelby, Robert L., 4,710,115, Cl. 425-117.000.

Nebraska Department of Economic Development, State of Nebraska: *See*—
Kea, Sandra; and Walker, Charles E., 4,710,567, Cl. 536-119.000.

NEC Corporation: *See*—
Higuchi, Misao, 4,710,900, Cl. 365-189.000.
Kimbara, Kohji, 4,710,592, Cl. 174-68.500.
Kobayashi, Tsuneo, 4,710,952, Cl. 379-269.000.
Koga, Toshio, 4,710,810, Cl. 358-133.000.
Nagami, Akira, 4,710,896, Cl. 365-149.000.
Sato, Toshifumi, 4,710,960, Cl. 381-47.000.
Watanabe, Tadashi, 4,710,867, Cl. 364-200.000.

Neefe, Charles W. Method of molding an eye color change contact lens blank. 4,710,327, Cl. 264-1.700.

Neefe, Charles W. Method of making an eye color change contact lens. 4,710,328, Cl. 264-1.700.

Neel, Jean-Philippe; Case, Roger; and Garnier, Gilbert, to Merlin Gerin. Moulded case circuit breaker. 4,710,738, Cl. 335-172.000.

Negi, Tsuneo, to Canon Kabushiki Kaisha. Data communication system. 4,710,925, Cl. 371-5.000.

Neki, Shigeo; Ohara, Kenichi; Shibata, Nobuho; and Dohi, Takashi, to Matsushita Electric Industrial Co., Ltd. Variable speed control with selectively enabled counter circuits. 4,710,688, Cl. 318-603.000.

Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. Malonate-based light stabilizers for plastics. 4,710,527, Cl. 524-98.000.

Nemoto, Hiroshi: *See*—
Okubo, Kimio; and Nemoto, Hiroshi, 4,709,512, Cl. 51-237.00R.

Nettleton, John E.: *See*—
Sluss, Elmer C.; Nettleton, John E.; and Barr, Dallas N., 4,710,941, Cl. 372-87.000.

Neubert, Fritz: *See*—
Ziemer, Wolf; Neubert, Fritz; and Holle, Wilhelm, 4,710,208, Cl. 55-355.000.

Neuhaus, Hans, to Polytype AG. Apparatus for changing the surface tension of cup-like containers. 4,710,358, Cl. 422-186.050.

Neuman, Richard C., to B. F. Goodrich Company, The. Melt processable CPVC blends. 4,710,533, Cl. 524-394.000.

New Holland Inc.: *See*—
Henderson, James S., 4,709,861, Cl. 239-675.000.
Naaktgeboren, Adrianus; and Van Eecke, Roger H., 4,710,086, Cl. 414-44.000.
Naaktgeboren, Adrianus; and Van Eecke, Roger H., 4,710,087, Cl. 414-44.000.

Newberg, Barry M., to Emerson Electric Co. Bearing retainer structure. 4,710,037, Cl. 384-537.000.

Newberry, Vincent J.: *See*—
Bryson, Neil B.; Auchterlonie, David T. T.; LeBlanc, Guy; and Newberry, Vincent J., 4,709,744, Cl. 164-472.000.

Newman, Geoffrey C. S.; Pilkington, Andrew L.; and Winch, Kenneth H., to Scortech Mech. Ltd. Simulation device. 4,710,129, Cl. 434-55.000.

NGK Insulators, Ltd.: *See*—
Matsui, Minoru; and Tsuno, Nobuo, 4,709,621, Cl. 92-212.000.

Nichols, Philip T. Tent fly apparatus and method. 4,709,718, Cl. 135-106.000.

Nickel, Hans: *See*—
Wissmann, Michael; Weber, Jurgen; and Nickel, Hans, 4,709,669, Cl. 123-149.00D.

Nicoll, Douglas E. Weighted beach blanket. 4,709,430, Cl. 5-417.000.

Nieh, Edward C. Y., to Texaco Inc. Selective recovery of carbon dioxide. 4,710,362, Cl. 423-228.000.

Nielsen, Susan T.: *See*—
Abou-Gharbia, Magid A.; and Nielsen, Susan T., 4,710,572, Cl. 544-267.000.

Nifco, Inc.: *See*—
Umezawa, Takashi; and Watanabe, Koji, 4,709,949, Cl. 292-6.000.

Niggl, Heinz: *See*—
Glomb, Kurt; Niggl, Heinz; Pelzl, Leo; and Zell, Karl, 4,710,132, Cl. 439-79.000.

Nihashi, Iwao: *See*—
Noda, Naoki; Nihashi, Iwao; and Sato, Kazuhiro, 4,710,608, Cl. 219-161.000.

Nihon Tokushu Noyaku Seizo K. K.: *See*—
Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, 4,710,509, Cl. 514-384.000.

Nihon Tokushu Noyaku Seizo K.K.: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Kagabu, Shinzo; Sakawa, Shinji; and Moriya, Koichi, 4,710,518, Cl. 514-624.000.

Niikura, Tatsuo: *See*—
Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, 4,710,215, Cl. 62-532.000.

Niiro, Yasuhiko: *See*—
Wakabayashi, Hiroharu; and Niiro, Yasuhiko, 4,710,976, Cl. 455-601.000.

Niizaki, Nobuya: *See*—
Saitoh, Takashi; Niizaki, Nobuya; Yamamura, Hideho; and Hayashi, Shinichi, 4,710,654, Cl. 307-601.000.

Nilsson, Bengt H., to Kamyr AB. Method for regulating the pressure of blow-through discharge steam from a reboiler of process steam produced during production of mechanical pulp. 4,710,268, Cl. 162-23.000.

Ninomiya, Hiroshi: *See*—
Nakama, Katsuhiko; Ninomiya, Hiroshi; Michishige, Toru; and Itsuki, Fumiaki, 4,709,976, Cl. 439-350.000.

Nippert, Georg; Hahn, Berthold; and Gobrecht, Jens, to Brown, Boveri & CIE Aktiengesellschaft. Semiconductor power module. 4,710,795, Cl. 357-65.000.

Nippon Air Brake Co., Ltd.: *See*—
Tanaka, Ryuichi; and Ishii, Akira, 4,709,968, Cl. 303-6.00C.

Nippon Chemi-Con Corp.: *See*—
Shinozaki, Fumihiko; and Yokoyama, Yutaka, 4,710,310, Cl. 252-62.200.

Nippon Electric Co., Ltd.: *See*—
Suzuki, Takeshi, 4,710,136, Cl. 439-374.000.

Nippon Electric Glass Company, Limited: *See*—
Yamanaka, Toshio; and Yamaguchi, Fumio, 4,710,479, Cl. 501-15.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Hotta, Tadahiko, 4,710,265, Cl. 437-29.000.

Nippon Hoso Kyokai: *See*—
Ando, Fumihiko, 4,710,817, Cl. 358-213.110.

Nippon Kogaku K. K.: *See*—
Katoh, Kinya, 4,710,029, Cl. 356-401.000.
Magome, Nobutaka; and Ichihara, Yutaka, 4,710,026, Cl. 356-349.000.
Okita, Masaya, 4,710,827, Cl. 360-10.100.
Shirasu, Hiroshi; Shimeno, Kazuhiro; and Iwamoto, Joji, 4,710,604, Cl. 219-121.0LU.
Terasawa, Hidenori, 4,709,997, Cl. 350-427.000.
Yabumoto, Seiichi, 4,710,816, Cl. 358-213.150.

Nippon Kogaku K.K.: *See*—
Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, 4,710,684, Cl. 318-254.000.
Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, 4,710,825, Cl. 358-342.000.

Nippon Kores Kabushiki Kaisha: *See*—
Hayashi, Seiichi; Nakamura, Takashi; and Tanabe, Hisayuki, 4,710,782, Cl. 346-76.00R.

Nippon Sanso Kabushiki Kaisha: *See*—
Iwasaki, Tadayoshi; Ariga, Keiki; and Sato, Makoto, 4,709,578, Cl. 73-49.300.

Nippon Steel Corporation: *See*—
Harase, Jiro; Ohta, Kuniteru; Takeshita, Tetsurou; and Endo, Michio, 4,709,742, Cl. 164-76.100.

Nippon Telegraph & Telephone Public Corp.: *See*—
Okamoto, Yoshiharu; Horikawa, Izumi; and Komaki, Shozo, 4,710,975, Cl. 455-276.000.

Nippon Valqua Kogyo Kabushiki Kaisha: *See*—
Nobuo, Kawahigashi; Shigesou, Hashida; and Yasunobu, Kojima, 4,710,331, Cl. 264-41.000.

Nippondenso Co., Ltd.: *See*—
Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, 4,710,106, Cl. 417-213.000.

Nishida, Masami: *See*—
Murakami, Tokumichi; Itoh, Atsushi; Asai, Kohtaro; Kamizawa, Koh; and Nishida, Masami, 4,710,812, Cl. 358-136.000.

Nishida, Reiziro: *See*—
Tominaga, Akira; and Nishida, Reiziro, 4,710,561, Cl. 528-111.000.

Nishida, Takashi: *See*—
Homma, Yoshio; and Nishida, Takashi, 4,710,398, Cl. 437-235.000.

Nishikawa, Masao: *See*—
Sakai, Shino; and Nishikawa, Masao, 4,709,792, Cl. 192-0.044.

Nishikawa, Tsutomu: *See*—
Soeda, Kazuhiko; Mori, Masakazu; Nishikawa, Tsutomu; and Tomimori, Kiyoshi, 4,710,022, Cl. 356-73.100.

Nishikuri, Masao: *See*—
Hattori, Makoto; Nishikuri, Masao; and Ueda, Yasuyoshi, 4,710,320, Cl. 260-378.000.

Nishimori, Masayoshi: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Nishimura, Akimasa, to Canon Kabushiki Kaisha. Loading and unloading system for flexible disc drive apparatus. 4,710,831, Cl. 360-99.000.

Nishimura, Asaichi. *See*—
Tonoki, Satoshi; Tsunemi, Hidenari; Nishimura, Asaichi; and Abe, Kunihisa, 4,710,420, Cl. 428-212.000.

Nishimura, Ikuma: *See*—
Nakamura, Junji; Nishimura, Ikuma; Saito, Goro; and Matsumoto, Kozo, 4,710,436, Cl. 429-41.000.

Nishimura, Izumi: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Nishimura, Kunio; and Hirakawa, Tadashi, to Teijin Limited. Base material for honeycomb core structure and process for producing the same. 4,710,432, Cl. 428-542.800.

Nishimura, Yutaka; and Oyama, Yoshishige, to Hitachi, Ltd. Air flow meter. 4,709,581, Cl. 73-202.000.

Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, to Hitachi Zosen Corporation. Apparatus for exposing fibrous reinforcements of fiber reinforced resin body. 4,709,714, Cl. 134-89.000.

Nishiuchi, Kenichi: *See*—
Yamada, Noboru; Nagashima, Michiyoshi; and Nishiuchi, Kenichi, 4,710,911, Cl. 369-100.000.

Nishiyodo Air Conditioner Co., Ltd.: *See*—
Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; and Okumura, Shin-ichi, 4,709,558, Cl. 62-480.000.

Nissan Motor Company, Limited: *See*—
Ichimaru, Yoshiro; Kobayashi, Shigeru; and Ohashi, Toshio, 4,709,751, Cl. 165-17.000.
Kai, Yasuaki; Sagawa, Takatoshi; and Tabata, Hiroshi, 4,709,988, Cl. 350-276.00R.
Takehara, Shin, 4,709,779, Cl. 180-300.000.
Ueno, Takashi; and Abo, Toshimi, 4,709,553, Cl. 60-602.000.

Nitto Electric Industrial Co., Ltd.: *See*—
Heller, Jorge; Skinner, Wilfred A.; Saito, Kenichiro; and Satoh, Susumu, 4,710,497, Cl. 514-221.000.

Niwa, Minoru: *See*—
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.

NL Chemicals, Inc.: *See*—
Reichert, William W.; Cody, Charles A.; Desesa, Michael A.; and Faulseit, Bruce K., 4,710,404, Cl. 427-386.000.

NL Industries, Inc.: *See*—
Bradley, William B.; and Holbrook, Philip, 4,710,906, Cl. 367-35.000.

NMR Imaging, Inc.: *See*—
Mee, Gary L.; and Willcott, M. Robert, 4,710,715, Cl. 324-307.000.

Nobuo, Kawahigashi; Shigesou, Hashida; and Yasunobu, Kojima, to Nippon Valqua Kogyo Kabushiki Kaisha. Process for the production of polytetrafluoroethylene porous membranes. 4,710,331, Cl. 264-41.000.

Noda, Kimihiko; Fujiura, Yoji; and Hasegawa, Yoichi, to Sanyo Chemical Industries, Ltd. Auxiliary for dewatering of sludge. 4,710,298, Cl. 210-505.000.

Noda, Naoki; Nihashi, Iwao; and Sato, Kazuhiro, to Toyota Jidosha Kabushiki Kaisha. Fixture for welding long workpieces. 4,710,608, Cl. 219-161.000.

Noguchi, Masaro: *See*—
Aoyama, Kohji; and Noguchi, Masaro, 4,710,135, Cl. 439-354.000.

Nohara, Fujio; and Fujinawa, Tomoaki, to Ikeda Mohando Co., Ltd. Pyridyloxy derivatives. 4,710,498, Cl. 514-242.000.

Noji, Masahide: *See*—
Kidani, Yoshinori; and Noji, Masahide, 4,710,577, Cl. 556-137.000.

Nojima, Shoshichi; Nomura, Hiroaki; and Okutani, Tetsuya, to Takeda Chemical Industries, Ltd. 2-(acetoacetyloxy)-3-(octadecyloxy)propyl-3-trimethylammoniopropyl phosphate or a pharmaceutically acceptable salt thereof. 4,710,579, Cl. 558-169.000.

Nomura, Hiroaki: *See*—
Nojima, Shoshichi; Nomura, Hiroaki; and Okutani, Tetsuya, 4,710,579, Cl. 558-169.000.

Nomura, Ikuo: *See*—
Emori, Yasuyoshi; and Nomura, Ikuo, 4,709,591, Cl. 74-422.000.

Nonaka, Susumu: *See*—
Shimada, Mitsuhiro; Matsumoto, Junichiro; Nonaka, Susumu; and Sayama, Haruo, 4,710,041, Cl. 400-120.000.

Nonaka, Yoshiyuki: *See*—
Hirabayashi, Shigeto; Matsuzaka, Syoji; Ohya, Yukio; and Nonaka, Yoshiyuki, 4,710,453, Cl. 430-505.000.

Nonomura, Keisaku: *See*—
Takeda, Makoto; Nonomura, Keisaku; and Yamamoto, Kunihiko, 4,710,768, Cl. 340-805.000.

Nordbrock, Raymond E.: *See*—
Ocken, Alfred G.; and Nordbrock, Raymond E., 4,710,657, Cl. 310-62.000.

Nordlund, Tore H., to Purac AB. Arrangement for preparing a charge of compositible material for a composting plant. 4,710,032, Cl. 366-156.000.

Nordson Corporation: *See*—
Mulder, Douglas C., 4,710,286, Cl. 209-250.000.

Nordstrom, Erik G. W., to Uponor AB. Method and apparatus for continuously extruding single-wall pipe of plastics or other mouldable material. 4,710,337, Cl. 264-508.000.

Nordyne, Inc.: *See*—
Reifel, Allan J., 4,709,753, Cl. 165-125.000.
Reifel, Allan J.; and Roth, James E., 4,710,610, Cl. 219-363.000.
Roth, James E.; and Bales, David W., 4,709,623, Cl. 98-40.050.

Norment Industries, Inc.: *See*—
Quante, Jeffrey B., III; Scoggin, Steven C.; Maxwell, Dennis L.; Rosenkoetter, Marvin W.; and Ferencik, James J., 4,709,659, Cl. 109-21.500.

Norris, Alan J., to Imperial Chemical Industries Plc. High voltage control. 4,710,849, Cl. 361-228.000.

North American Philips Consumer Electronics Corp.: *See*—
Zoladz, Frank J., 4,709,828, Cl. 220-76.000.

Northern Telecom Limited: *See*—
Cristescu, Alex G.; and Conea, Christopher A., 4,709,463, Cl. 29-566.300.
Garner, John N., 4,710,114, Cl. 425-110.000.
Marcantonio, Gabriel, 4,710,798, Cl. 357-80.000.
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., 4,710,594, Cl. 174-120.0SR.

Northrop Corporation: *See*—
Rowe, James M.; and Modster, Rudolph W., 4,710,433, Cl. 428-623.000.

Northrup, Walter E.; and Freeman, Maurice E., to Minnesota Mining and Manufacturing Company. Fastener assembly with heat shrinkable film cover. 4,710,414, Cl. 428-43.000.

Nossen, Edward J., to RCA Corporation. Dual transmit-receive space diversity communication system. 4,710,944, Cl. 375-40.000.

Noto, Frank A.: *See*—
Barto, Ronald J.; Goodstine, Stephen L.; and Noto, Frank A., 4,709,664, Cl. 122-379.000.

Novello, Frederick C.: *See*—
Willard, Alvin K.; Novello, Frederick C.; Hoffman, William F.; and Cragoe, Edward J., Jr., 4,710,513, Cl. 514-460.000.

Novitex s.r.l.: *See*—
Camiciotti, Leonardo; and Furia, Edoardo, 4,709,563, Cl. 66-222.000.

Novotny, Bernd: *See*—
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, 4,710,814, Cl. 358-143.000.

Novus Inc.: *See*—
Tingley, Eddie S., 4,709,513, Cl. 51-283.00R.

Nowell, Gilbert S.: *See*—
Slosberg, David K.; and Nowell, Gilbert S., 4,710,415, Cl. 428-48.000.

Nozaki, Takashi; and Hashimoto, Takashi, to Pioneer Electronic Corporation. Channel selecting device for CATV terminal unit. 4,710,971, Cl. 455-179.000.

Numar Corporation: *See*—
Strikman, Shmuel, 4,710,713, Cl. 324-303.000.

Nuovopignone-Industrie Meccaniche e Fonderia S.p.A.: *See*—
Biagini, Giuliano; and Bartolozzi, Roberto, 4,709,854, Cl. 236-20.00R.

Nyffeler, Urs: *See*—
Gaisch, Helmut; and Nyffeler, Urs, 4,709,710, Cl. 131-308.000.

Oana, Yasuhisa, to Kabushiki Kaisha Toshiba. Method of manufacturing a color-matrix-type liquid crystal display device. 4,709,990, Cl. 350-339.00F.

Obara, Haruki, to Fanuc Ltd. Electric discharge machining power source. 4,710,603, Cl. 219-69.00C.

Obarowski, Richard: *See*—
Vietrogoski, Charles J.; Obarowski, Richard; and McDonough, Paul J., 4,709,608, Cl. 83-355.000.

Obel, Werner; and Zahn, Klaus, to Deere & Company. Telescopic adjusting crank for tractor 3-point hitch. 4,709,941, Cl. 280-461.00A.

Ochi, Shigeki: *See*—
Doi, Yoshihiko; Kuroishi, Nobuhito; Ochi, Shigeki; and Uenishi, Noboru, 4,710,345, Cl. 419-28.000.

Ochiai, Toshio; Tsujimura, Akio; and Tsukiyasu, Hiroshi, to Toyo Seikan Kaisha, Ltd.; and Komatsu Forklift Kabushiki Kaisha. Loading and unloading apparatus. 4,710,091, Cl. 414-623.000.

Ochii, Kiyofumi: *See*—
Masuoka, Fujio; and Ochii, Kiyofumi, 4,710,897, Cl. 365-182.000.

Ockelmann, Dieter: *See*—
Franke, Gunter; Ockelmann, Dieter; Raue, Roderich; and Wild, Peter, 4,710,569, Cl. 544-31.000.

Ocken, Alfred G.; and Nordbrock, Raymond E., to Motorola, Inc. Semi enclosed alternator. 4,710,657, Cl. 310-62.000.

O'Connell, Bonnie. Glove-like dynamic splint and method of using same. 4,709,694, Cl. 128-87.00A.

Oculus Optikgeraete GmbH: *See*—
Spitznas, Manfred; Reiner, Josef; Veit, Wolfgang; and Kirchhuebel, Rainer, 4,710,000, Cl. 350-516.000.

Odagawa, Atsuo: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.

O'Dell, Robert R.: *See*—
Belknap, William M.; Chanasyk, Albert J.; O'Dell, Robert R.; and Girard, Donald J., 4,710,871, Cl. 364-200.000.

Oestreich, Ulrich; and Mayr, Ernst, to Siemens Aktiengesellschaft. Ribbon-shaped transmission element and method of manufacture. 4,709,984, Cl. 350-96.230.

Oetting, Steven L., to El Paso Products Company. Process for the recovery of amorphous devaporized polyalphaolefin. 4,710,563, Cl. 528-501.000.

Office National d'Etudes et de Recherche Aerospatiales (O.N.E.R.A.): *See*—
Fima, Henri; and Janiaud, Denis, 4,710,668, Cl. 310-323.000.

Officine Agusto Cattani & C. S.p.A.: *See*—
Cattani, Augusto, 4,710,209, Cl. 55-418.000.

Offt, Alan M.: *See*—
Hoogenboom, Leo; Jackson, Robert L., Jr.; Kraft, Russell P.; and Offt, Alan M., 4,710,808, Cl. 358-107.000.

Ogasawara, Tadashi: *See*—
Yoneda, Takao; Ogasawara, Tadashi; Ohta, Norio; and Sakakibara, Yasuji, 4,709,509, Cl. 51-165.710.

Ogata, Shun-ichiro: *See*—
Dupont, Bo; Morishima, Yasuo; Collins, Nancy; Ogata, Shun-ichiro; and Lloyd, Kenneth O., 4,710,457, Cl. 435-7.000.

Ogawa, Hiroshi: *See*—
Ono, Toshio; Tamai, Yasuo; Mizuno, Chiaki; Ogawa, Hiroshi; and Saito, Shinji, 4,710,421, Cl. 428-213.000.

Ogawa, Toshio, to Murata Manufacturing Co., Ltd. Piezoelectric ceramic composition. 4,710,311, Cl. 252-62.900.

Ohara Co., Ltd.: *See*—
Nakamura, Seizo, 4,709,741, Cl. 164-35.000.

Ohara, Kenichi: *See*—
Neki, Shigeo; Ohara, Kenichi; Shibata, Nobuho; and Dohi, Takashi, 4,710,688, Cl. 318-603.000.

Ohashi, Makoto: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Ohashi, Toshio: *See*—
Ichimaru, Yoshiro; Kobayashi, Shigeru; and Ohashi, Toshio, 4,709,751, Cl. 165-17.000.

Ohkawa, Tihiro, to United States of America, Energy. Ion cyclotron range of frequencies heating of plasma with small impurity production. 4,710,339, Cl. 376-123.000.

Ohkoshi, Akio; Tsuruta, Koji; Nakagawa, Hideaki; and Shimada, Satoshi, to Sony Corporation. Luminescent display device. 4,710,765, Cl. 340-781.000.

Ohkuma, Taka'aki: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,710,517, Cl. 514-616.000.

Ohkura, Hideaki: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Ohshima, Ken; and Shimizu, Tadashi, to Olympus Optical Company Limited. Servo apparatus for compensating for warp and deflection deviations on optical discs. 4,710,908, Cl. 369-32.000.

Ohta, Kuniteru: *See*—
Harase, Jiro; Ohta, Kuniteru; Takeshita, Tetsurou; and Endo, Michio, 4,709,742, Cl. 164-76.100.

Ohta, Norio: *See*—
Yoneda, Takao; Ogasawara, Tadashi; Ohta, Norio; and Sakakibara, Yasuji, 4,709,509, Cl. 51-165.710.

Ohta, Shinichi, to Canon Kabushiki Kaisha. Image recording apparatus. 4,710,821, Cl. 358-256.000.

Ohtomo, Nobuya; Mizuno, Kyosuke; Hamada, Fukusaburo; and Mizokami, Hiroshi, to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute. Lyophilized hepatitis B vaccine. 4,710,378, Cl. 424-89.000.

Ohtsubo, Mitsuru: *See*—
Okoshi, Noboru; Motomura, Masatoshi; Ohtsubo, Mitsuru; and Ikeda, Takenori, 4,710,230, Cl. 106-308.00N.

Ohya, Takegi, to Mazda Motor Corporation. Front door structure for vehicle. 4,709,957, Cl. 296-146.000.

Ohya, Yukio: *See*—
Hirabayashi, Shigeto; Matsuzaka, Syoji; Ohya, Yukio; and Nonaka, Yoshiyuki, 4,710,453, Cl. 430-505.000.

Ohyma, Kanji: *See*—
Komano, Tohru; and Ohyma, Kanji, 4,710,461, Cl. 435-68.000.

Oikawa, Toshiyuki: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Oil Patch Group, Inc.: *See*—
Perkin, Gregg S.; and Papke, Duane D., 4,709,462, Cl. 29-434.000.

Oilgear Company, The: *See*—
Kanies, Kerry R., 4,710,107, Cl. 417-269.000.

Oinonen, Hannu U., to Oy Wartsila Oy. Method and apparatus for reeling a web. 4,709,867, Cl. 242-56.00R.

Oka, Tetsuo: *See*—
Katsumata, Ryoichi; Ozaki, Akio; Oka, Tetsuo; and Furuya, Akira, 4,710,471, Cl. 435-253.000.

Okada, Hideo: *See*—
Bahn, Itsuki; and Okada, Hideo, 4,710,683, Cl. 318-254.000.

Okada, Kikujiro: *See*—
Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, 4,710,161, Cl. 494-84.000.

Okada, Masami: *See*—
Suzuki, Mitsutoshi; Morita, Yoshitaka; Okada, Masami; and Shimohara, Jun, 4,710,297, Cl. 210-493.200.

Okada, Shinjiro: *See*—
Kanbe, Junichiro; and Okada, Shinjiro, 4,709,994, Cl. 350-350.00S.

Okada, Yasutaka: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Okamoto, Kunihide: *See*—
Suzuki, Hideo; Okamoto, Kunihide; Hayashi, Yasuyuki; and Aiba, Mitsuru, 4,709,934, Cl. 280-6.00R.

Okamoto, Tatsuo; Eguchi, Kouji; and Oosaki, Saburou, to Mitsubishi Denki Kabushiki Kaisha. MOS transistor. 4,710,790, Cl. 357-23.600.

Okamoto, Ted T., to Ethyl Corporation. Olefin purification process. 4,710,273, Cl. 203-29.000.

Okamoto, Yasushi: *See*—
Imai, Akio; Okamoto, Yasushi; and Saito, Masatoshi, 4,710,554, Cl. 526-180.000.

Okamoto, Yoshiharu; Horikawa, Izumi; and Komaki, Shozo, to Nippon Telegraph & Telephone Public Corp. Space diversity reception system having compensation means of multipath effect. 4,710,975, Cl. 455-276.000.

Okamura, Hisashi: *See*—
Naoi, Takashi; Fujioka, Takashi; Okamura, Hisashi; and Satake, Masaki, 4,710,456, Cl. 430-564.000.

Okano, Shinobu: *See*—
Tosaka, Akio; Hashiguchi, Koichi; Morita, Masahiko; and Okano, Shinobu, 4,709,557, Cl. 62-373.000.

Okazaki, Hiroshi: *See*—
Kazaoka, Kenichi; and Okazaki, Hiroshi, 4,709,965, Cl. 297-366.000.

Oki Electric Industry Co., Ltd.: *See*—
Itezono, Toshiyuki, 4,710,951, Cl. 379-100.000.
Tanaka, Seietsu, 4,710,797, Cl. 357-74.000.

Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, to Nippon Kogaku K.K. Drive circuit for brushless DC motors. 4,710,684, Cl. 318-254.000.

Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, to Nippon Kogaku K.K. Disc recording system with speed control. 4,710,825, Cl. 358-342.000.

Okita, Masaya, to Nippon Kogaku K. K. Servo apparatus. 4,710,827, Cl. 360-10.100.

Okoshi, Noboru; Motomura, Masatoshi; Ohtsubo, Mitsuru; and Ikeda, Takenori, to Dainippon Ink and Chemicals, Inc. Pigment paste. 4,710,230, Cl. 106-308.00N.

Oku, Kenzo: *See*—
Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; and Okumura, Shin-ichi, 4,709,558, Cl. 62-480.000.

Okubo, Kimio; and Nemoto, Hiroshi, to Fujitsu Limited. Chucking device of workpiece in grinding machine. 4,709,512, Cl. 51-237.00R.

Okumura, Shin-ichi: *See*—
Matsushita, Masao; Oku, Kenzo; Nakano, Hiroki; and Okumura, Shin-ichi, 4,709,558, Cl. 62-480.000.

Okumura, Tokiko: *See*—
Yamaguchi, Youko; Shimizu, Hiroshi; Tsuda, Ichiro; Yano, Masafumi; and Okumura, Tokiko, 4,710,964, Cl. 382-17.000.

Okutani, Tetsuya: *See*—
Nojima, Shoshichi; Nomura, Hiroaki; and Okutani, Tetsuya, 4,710,579, Cl. 558-169.000.

Okuyama, Gen: *See*—
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Oliver, John P.: *See*—
Soukup, Thomas G.; and Oliver, John P., 4,710,521, Cl. 521-118.000.

Oliver, Stewart W.; and Cosgrove, John, to International Teldata Corporation. Multiplex system for automatic meter reading. 4,710,919, Cl. 370-96.000.

Olmsted, Dennis R.: *See*—
Smith, David E.; Olmsted, Dennis R.; and Fryberger, Joseph A., 4,709,873, Cl. 242-195.000.

Olsen, Peter C., Jr.; Conforto, Peter M.; Craighead, Jimmy R.; and Wolf, David L., to Manville Corporation. Apparatus for feeding and opening a beverage carrier. 4,709,538, Cl. 53-566.000.

Olsen, Robert F., to Owens-Illinois Glass Container Inc. Bottle conveyor with brush spacer. 4,709,800, Cl. 198-459.000.

Olympia Aktiengesellschaft: *See*—
Lewandowski, Dieter; Ostermoor, Rolf; and Spranger, Dieter, 4,710,330, Cl. 264-25.000.

Olympus Optical Company Limited: *See*—
Ohshima, Ken; and Shimizu, Tadashi, 4,710,908, Cl. 369-32.000.
Ushikubo, Masao, 4,710,355, Cl. 422-100.000.
Yamanashi, Takanori, 4,709,998, Cl. 350-454.000.

Om Electronics Systems Corp.: *See*—
Ahuja, Om, 4,710,949, Cl. 379-26.000.

Omni Spray, Inc.: *See*—
Patrick, Keith H.; and Murchison, Charles W., 4,709,860, Cl. 239-654.000.

Omron Tateisi Electronics Co.: *See*—
Hirano, Masao; Kato, Mitsutaka; Yasuda, Hirohiko; and Hinoda, Seisuke, 4,710,033, Cl. 374-161.000.
Miyamoto, Kiyoshi, 4,710,699, Cl. 323-324.000.
Nakama, Katsuhiko; Ninomiya, Hiroshi; Michishige, Toru; and Itsuki, Fumiaki, 4,709,976, Cl. 439-350.000.

Onimura, Kichiro: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Ono, Kouichi: *See*—
Oomori, Tatsuo; Ono, Kouichi; and Fujita, Shigeto, 4,710,937, Cl. 372-53.000.

Ono, Masayoshi: *See*—
Yoshimura, Toshiteru; Kobayashi, Takayuki; and Ono, Masayoshi, 4,709,943, Cl. 280-751.000.

Ono, Toshio; Tamai, Yasuo; Mizuno, Chiaki; Ogawa, Hiroshi; and Saito, Shinji, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,710,421, Cl. 428-213.000.

Ono, Yuichi: *See*—
Usagawa, Toshiyuki; Ono, Yuichi; and Takahashi, Susumu, 4,710,787, Cl. 357-16.000.

Onoe, Susumu: *See*—
Matsuoka, Hiroshi; and Onoe, Susumu, 4,710,155, Cl. 474-260.000.

Ookubo, Hiroaki, to Matsushita Electric Industrial Co. Ltd. Platen clutch mechanism. 4,710,046, Cl. 400-556.200.

Oomori, Tatsuo; Ono, Kouichi; and Fujita, Shigeto, to Mitsubishi Denki Kabushiki Kaisha. Laser system. 4,710,937, Cl. 372-53.000.

Ooms, Richard A., to AGFA-Gevaert N.V. High contrast development of silver halide emulsion material. 4,710,451, Cl. 430-441.000.

Oosaki, Saburou: *See*—
Okamoto, Tatsuo; Eguchi, Kouji; and Oosaki, Saburou, 4,710,790, Cl. 357-23.600.

Opitz, Hans-Georg: *See*—
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, 4,710,491, Cl. 514-42.000.

Orsburn, Michael L.: *See*—
Fearing, Craig; and Orsburn, Michael L., 4,710,800, Cl. 358-22.000.

Ortolano, Ralph J. Connected turbine shrouding. 4,710,102, Cl. 416-190.000.

Osaka Kanagu Co., Ltd.: *See*—
Minami, Saburo, 4,709,564, Cl. 70-25.000.

Osaki, Shigeyoshi; and Fujii, Yoshihiko, to Kanzaki Paper Manufacturing Co., Ltd. Method of measuring orientation or dielectric characteristic of dielectric sheets or webs. 4,710,700, Cl. 324-58.50A.

Osborne, Thomas L.: *See*—
Debus, Walter, Jr.; Osborne, Thomas L.; and Siller, Curtis A., Jr., 4,710,891, Cl. 364-718.000.

Oscar Mayer Foods Corporation: *See*—
Borsuk, Alvin, 4,709,449, Cl. 17-32.000.

Ostermoor, Rolf: *See*—
Lewandowski, Dieter; Ostermoor, Rolf; and Spranger, Dieter, 4,710,330, Cl. 264-25.000.

Ostrea, Antonio M. Gold recovery by sulhydric-fatty acid flotation as applied to gold ores/cyanidation tailings. 4,710,361, Cl. 423-26.000.

Ostrow, Milan R.: *See*—
Mahaffy, Reid A.; Garson, Eugene; and Ostrow, Milan R., 4,709,535, Cl. 53-473.000.

Ota, Tadashi: *See*—
Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, 4,710,684, Cl. 318-254.000.
Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, 4,710,825, Cl. 358-342.000.

Otake, Hiromasa, to Fanuc Ltd. Injection molding machine using servo motor and having mold protecting function. 4,710,119, Cl. 425-136.000.

Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, to Microbial Chemistry Research Foundation. Anthracycline compounds. 4,710,564, Cl. 536-6.400.

Otis Engineering Corporation: *See*—
Setterberg, John R., Jr., 4,709,761, Cl. 166-387.000.

Ototani, Tohei: *See*—
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Otsuka Pharmaceutical Co., Ltd.: *See*—
Bodor, Nicholas S., 4,710,495, Cl. 514-174.000.

Ottaviano, Gary W. Chemiluminescent fishing lure device. 4,709,499, Cl. 43-17.600.

Ottlinger, Ralph: *See*—
Jira, Reinhard; and Ottlinger, Ralph, 4,710,558, Cl. 528-14.000.

Oude Elberink, Bernard H. M.: *See*—
Gietema, Jouke; and Oude Elberink, Bernard H. M., 4,710,773, Cl. 342-185.000.

Outboard Marine Corporation: *See*—
Broman, Donald E.; Hansen, Loren F.; and Huber, Donald J., 4,709,541, Cl. 56-202.000.
Ferguson, Arthur R., 4,710,141, Cl. 440-61.000.

Overhues, Egon, to Vossloh-Werke GmbH. Self-locking resilient or non-resilient element. 4,710,081, Cl. 411-161.000.

Ovshinsky, Stanford R.; and Madan, Arun. Wide band gap semiconductor alloy material. 4,710,786, Cl. 357-2.000.

Ovshinsky, Stanford R.: *See*—
Young, Rosa; and Ovshinsky, Stanford R., 4,710,899, Cl. 365-113.000.

Owens-Corning Fiberglas Corporation: *See*—
Broderick, Thomas B.; Algrim, Donald J.; and Hayden, Richard F., 4,709,523, Cl. 52-406.000.

Owens-Illinois Closure Inc.: *See*—
Mumford, George V., 4,709,825, Cl. 215-318.000.

Owens-Illinois Glass Container Inc.: *See*—
Olsen, Robert F., 4,709,800, Cl. 198-459.000.

Owens-Illinois Plastic Products Inc.: *See*—
Balduff, Dennis C.; and Jabarin, Saleh A., 4,709,808, Cl. 206-158.000.

Oy Tampella AB: *See*—
Leppanen, Jarmo, 4,710,065, Cl. 405-303.000.

Oy Wartsila Oy: *See*—
Oinonen, Hannu U., 4,709,867, Cl. 242-56.00R.

Oyama, Yoshishige: *See*—
Nishimura, Yutaka; and Oyama, Yoshishige, 4,709,581, Cl. 73-202.000.

Oyo Corporation: *See*—
Hall, Ernest M., Jr.; and Buis, Jeffrey A., 4,710,593, Cl. 174-88.00R.

Ozaki, Akio: *See*—
Katsumata, Ryoichi; Ozaki, Akio; Oka, Tetsuo; and Furuya, Akira, 4,710,471, Cl. 435-253.000.

Ozaki, Kazuhisa: *See*—
Sakakibara, Shiro; and Ozaki, Kazuhisa, 4,709,793, Cl. 192-4.00A.

Ozawa, Motoo: *See*—
Saito, Naoyuki; and Ozawa, Motoo, 4,709,774, Cl. 180-229.000.

P. J. Zweegers en Zonen, B.V.: *See*—
Collart, Johannes A., 4,709,540, Cl. 56-13.600.

PA Incorporated: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.

Pace, Salvatore J.: *See*—
Bock, Jan; Pace, Salvatore J.; and Schulz, Donald N., 4,709,759, Cl. 166-275.000.

Pacific Scientific Co.: *See*—
Larsen, Richard R., 4,710,050, Cl. 403-51.000.

Padar, Steve: *See*—
Schwab, Egon; and Padar, Steve, 4,710,168, Cl. 604-99.000.

Paerisch, Jochen; Herlemann, Werner; and Schaetzler, Walter, to Webasto-Werk W. Baier GmbH & Co.; and Daimler-Benz AG. Sliding and lifting roof. 4,709,959, Cl. 296-217.000.

PAG America Ltd.: *See*—
Hawkins, Clive F. J., 4,709,974, Cl. 439-345.000.

PAG Limited: *See*—
Hawkins, Clive F. J., 4,709,974, Cl. 439-345.000.

Pagowski, Stefan: *See*—
McGuire, Bernie; Innes, Robert S.; and Pagowski, Stefan, 4,709,448, Cl. 17-11.000.

Palinczar, Victor. Waterproof sunscreen compositions. 4,710,371, Cl. 424-47.000.

Palitex Project-Company GmbH: *See*—
Lorenz, Rainer, 4,709,543, Cl. 57-58.700.

Palmer, John M.: *See*—
Voorhis, Roger; Erbs, Daryl G.; Palmer, John M.; and Marris, Derrick A., 4,709,560, Cl. 62-508.000.

Papke, Duane D.: *See*—
Perkin, Gregg S.; and Papke, Duane D., 4,709,462, Cl. 29-434.000.

Paprocki, Stanley J.: *See*—
Saller, Henry A., deceased; Hodge, Edwin S.; Paprocki, Stanley J.; and Dayton, Russell W., 4,709,848, Cl. 228-159.000.

Paradis, Roger O. Open cell sheeting. 4,709,688, Cl. 126-415.000.

Pardee, Douglas L.: *See*—
Sciacero, James R.; and Pardee, Douglas L., 4,710,767, Cl. 340-799.000.

Parenteau, Richard R.: *See*—
Thornburg, Dennis D.; and Parenteau, Richard R., 4,710,756, Cl. 340-628.000.

Park, Yong S.: *See*—
Layre, John; Park, Yong S.; and Schollhamer, George K., 4,709,625, Cl. 99-289.00R.

Parker, Kenneth B.: *See*—
Blair, Christon R.; and Parker, Kenneth B., 4,710,061, Cl. 405-195.000.

Parker, Merle A.; Pregnall, Richard A.; and Ahmed, Hassan J., to Westinghouse Electric Corp. Measurement of moisture content. 4,709,579, Cl. 73-76.000.

Parker, William L. Method and apparatus for restoring a beach. 4,710,056, Cl. 405-15.000.

Parkinson, James G.; and Kirsten, Thomas P. Protective device. 4,709,966, Cl. 297-473.000.

Parrish, Gregory K.: *See*—
Holmgren, Mark E.; Parrish, Gregory K.; and Cartier, Philip A., 4,710,393, Cl. 426-660.000.

Pas, Ireneus J. T. M.: *See*—
Fierkens, Richardus H. J.; and Pas, Ireneus J. T. M., 4,710,094, Cl. 414-752.000.

Pasek, Eugene A.: *See*—
Lopez, Jaime; and Pasek, Eugene A., 4,710,486, Cl. 502-219.000.

Passarelli, Frank J.; Matsukas, George A.; and Caspary, Charles P. Distilling apparatus. 4,710,272, Cl. 202-205.000.

Pastecki, Andrew S. Cooling accessory attachable to an electronic instrument. 4,710,851, Cl. 361-384.000.

Patchell, John W.: *See—*
Rich, Brian G.; Patchell, John W.; and Harman, R. Keith, 4,710,753, Cl. 340-561.000.
Patel, Arvind D.; and Salandanan, Carmelita S., to Dresser Industries, Inc. Fluid loss additives for oil base muds and low fluid loss compositions thereof. 4,710,586, Cl. 560-68.000.
Patent-Treuhand-Gesellschaft fur elektrische Gluhlampen m.b.H.: *See—*
Zuchtriegel, Anton, 4,710,682, Cl. 315-224.000.
Patrick, Keith H.; and Murchison, Charles W., to Omni Spray, Inc. System for applying pesticides without drift. 4,709,860, Cl. 239-654.000.
Patrovsky, Hubert. Filtration system. 4,710,288, Cl. 210-111.000.
Patzelt, Norbert: *See—*
Henne, Heinrich; Patzelt, Norbert; Schneider, Lutz T.; Knobloch, Osbert; and Muller, Manfred, 4,709,864, Cl. 241-167.000.
Paulus, Henry G. Fluid pump apparatus. 4,710,110, Cl. 418-15.000.
Peerless Plastics Packaging Limited: *See—*
Bagnall, Paul J. H.; and Whiteley, Norman, 4,710,338, Cl. 264-509.000.
Pegels, Doris, heir: *See—*
Appenzeller, Valentin, deceased; Appenzeller, Maria, heir; Appenzeller, Regine, heir; Pegels, Doris, heir; and Appenzeller, Ernst, heir, 4,709,629, Cl. 100-162.00B.
Peham, Engelbert J. Snap action hinged support for a collapsible top hat. 4,709,422, Cl. 2-180.000.
Peiffer, Dennis G.; and Lundberg, Robert D., to Exxon Research and Engineering Company. Novel polyampholyte compositions possessing high degrees of acid, base, or salt tolerance in solution. 4,710,555, Cl. 526-240.000.
Pelc, Norbert J.; and Glover, Gary H., to General Electric Company. Method for fast scan cine NMR imaging. 4,710,717, Cl. 324-309.000.
Pelchat, Guy; and Crabtree, Luther L., to Harris Corporation. Receiver having a modulation amplifier for enhancing reception of a desired signal in the presence of interference. 4,710,723, Cl. 329-192.000.
Pelley, Perry H., III; and Morton, Bruce L., to Motorola, Inc. Technique restore for a dynamic random access memory. 4,710,902, Cl. 365-222.000.
Pelster, Bernhard: *See—*
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, 4,710,491, Cl. 514-42.000.
Pelzl, Leo: *See—*
Glomb, Kurt; Niggl, Heinz; Pelzl, Leo; and Zell, Karl, 4,710,132, Cl. 439-79.000.
Pepera, Marc A.: *See—*
Dolhyj, Serge R.; Shaw, Wilfrid G.; and Pepera, Marc A., 4,710,484, Cl. 502-208.000.
Perdue, Terry A.; and Cubbage, William, to Zenith Electronics Corporation. Cable strain relief. 4,710,137, Cl. 439-457.000.
Peremartoni Vegyipari Vallalat: *See—*
Vertesi, Csaba; Molnar, Attila; and Guczoghy, Lajos, 4,710,578, Cl. 558-4.000.
Periard, Jacques; and Cron, Alain, to Lonza Ltd. Pickling agent. 4,710,307, Cl. 252-18.000.
Perkin, Gregg S.; and Papke, Duane D., to Oil Patch Group, Inc. Method for assembling a well drilling tool. 4,709,462, Cl. 29-434.000.
Perregaard, Jens K., to H. Lundbeck A/S. 1-(4'-fluorophenyl)-3,5-substituted indoles useful in the treatment of psychic disorders and pharmaceutical compositions thereof. 4,710,500, Cl. 514-254.000.
Perrot, Pierre; and Vuillemey, Georges, to Rhone-Poulenc Fibres. Masterbatches for delustring polyamides. 4,710,535, Cl. 524-413.000.
Personal Products Company: *See—*
DeRossett, Edmund Z.; and Luceri, Thomas J., 4,710,186, Cl. 604-383.000.
Peters, Douglas C.; and Hansen, Charles S., to Dahlquist, Art. Device for transporting trees and the like. 4,709,955, Cl. 296-3.000.
Peters, Mark C. Fastening overlaying sheets by punch and die apparatus. 4,709,458, Cl. 29-243.500.
Petersen, C. William. Apparatus and method for sterilizing with vaporizable liquids. 4,710,350, Cl. 422-37.000.
Petersen, Christian, to Petersen Manufacturing Co., Inc. Long nose locking pliers. 4,709,601, Cl. 81-367.000.
Petersen Manufacturing Co., Inc.: *See—*
Petersen, Christian, 4,709,601, Cl. 81-367.000.
Peterson, Richard L., to Infinity Boring Tool Company. Tool apparatus for boring a hole. 4,710,073, Cl. 408-181.000.
Peterssen, Rudolf: *See—*
Haug, Kurt; and Peterssen, Rudolf, 4,710,857, Cl. 362-80.000.
Petr, Jan, to Lgz Landis & Gyr Zug AG. Interference signal component compensation circuit. 4,710,652, Cl. 307-491.000.
Petrarch Systems, Inc.: *See—*
Lewis, James M.; and Blakeney, Andrew J., 4,710,449, Cl. 430-326.000.
Petre, Janet E.: *See—*
Livingston, Douglas A.; and Petre, Janet E., 4,710,565, Cl. 536-16.500.
Petrzelka, Antonin: *See—*
Bis, Josef; and Petrzelka, Antonin, 4,709,434, Cl. 12-77.000.
Petschner, Goetz, to IMAG-Verlage AG fur Immaterialguterrecht. Double-wall sack made of circular-woven tube with gathered loop. 4,710,967, Cl. 383-8.000.
Pettigrew, F. Alexander, to Ethyl Corporation. Cross-linked phosphazene polymer. 4,710,549, Cl. 525-538.000.
Pfeffer, George B.: *See—*
Bradley, James D.; and Pfeffer, George B., 4,710,138, Cl. 439-581.000.
Pfizer Inc.: *See—*
Campbell, Simon F.; and Roberts, David A., 4,710,507, Cl. 514-312.000.
Walinsky, Stanley W., 4,710,537, Cl. 524-549.000.
Phillips, James G., to PPG Industries, Inc. Herbicidally active substituted diphenyl ether oxime derivatives. 4,710,582, Cl. 560-35.000.
Phillips Petroleum Company: *See—*
Gentry, Cecil C.; and Small, William M., 4,709,755, Cl. 165-160.000.
Phillips Plastics Corporation: *See—*
Wollar, Burnell, 4,709,841, Cl. 227-55.000.
Philpot, James E., to Teledyne Industries Inc. Surface heating element support spider. 4,709,573, Cl. 72-379.000.
Phung, Ha T. Combination comb, hair trimmer and safety razor. 4,709,475, Cl. 30-31.000.
Picker International Ltd.: *See—*
McGinley, John V. M., 4,710,741, Cl. 335-296.000.
Pidsosny, Richard A.: *See—*
Burke, Michael J.; Pidsosny, Richard A.; and Lehner, Gerald J., 4,710,888, Cl. 364-561.000.
Pierson, Karl B.; Mooney, Thomas E.; and Jones, William G., to Betts Industries, Inc. Fluid power operated sliding gate valve system for tank trucks, pipelines, storage tanks and the like. 4,709,901, Cl. 251-58.000.
Piesik, Edward T., to General Dynamics, Pomona Division. Exhaust dissipator/disrupter device. 4,709,780, Cl. 181-213.000.
Pietrasz, Vincent: *See—*
Ward, Thomas H.; Costanzo, Phillip A.; Pietrasz, Vincent; and Soeder, Edmund J., 4,710,344, Cl. 419-8.000.
Pietrzak, Carl M., Jr.: *See—*
Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., 4,710,945, Cl. 375-100.000.
Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., 4,710,957, Cl. 380-42.000.
Pilkington, Andrew L.: *See—*
Newman, Geoffrey C. S.; Pilkington, Andrew L.; and Winch, Kenneth H., 4,710,129, Cl. 434-55.000.
Pilliod Cabinet Company, The: *See—*
Lenger, Sidney A., 4,709,641, Cl. 108-102.000.
Pinder, Thomas E.: *See—*
Gross, Anthony E.; Christie, Richard D.; and Pinder, Thomas E., 4,710,285, Cl. 209-166.000.
Pines, Alexander: *See—*
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, 4,710,714, Cl. 324-307.000.
Pinson, George T., to Boeing Company, The. Pneumatic missile seeker head. 4,709,876, Cl. 244-3.160.
Pioneer Electronic Corporation: *See—*
Nozaki, Takashi; and Hashimoto, Takashi, 4,710,971, Cl. 455-179.000.
Yamada, Fumiya; Matsuki, Seiichiro; Kawamura, Masahiko; and Kawamoto, Masashi, 4,710,835, Cl. 360-106.000.
Pischinger, Franz; Lepperhoff, Gerhard; and Huthwohl, Georg, to FEV Motorentechnik GmbH & Co. KG. Process for the regeneration of engine emission particulates deposited in a particulate trap. 4,709,547, Cl. 60-274.000.
Pischky, Hans, to Ciba-Geigy Corp. Biocidal paste. 4,710,220, Cl. 71-67.000.
Pischtschan, Alfred: *See—*
Meier, Helmut-Martin; Heine, Hans-Georg; Pischtschan, Alfred; Dhein, Rolf; and Rudolph, Hans, 4,710,529, Cl. 524-139.000.
Pithouse, Kenneth B.: *See—*
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., 4,709,948, Cl. 285-381.000.
Pitney Bowes Inc.: *See—*
Cordery, Robert A., 4,710,752, Cl. 340-551.000.
DiGiulio, Peter C.; and Stalzer, Henry, 4,710,882, Cl. 364-464.000.
Wilson, Woody W.; and Wadsworth, Nathaniel G., 4,710,883, Cl. 364-466.000.
Pittet, Alan O.; Muralidhara, Ranya; and Hagedorn, Myrna L., to International Flavors & Fragrances Inc. Use of 4,4A,5,6-tetrahydro-7-methyl-2-(3H) naphthalenone in augmenting or enhancing the aroma or taste of smoking tobacco and smoking tobacco articles. 4,709,707, Cl. 131-276.000.
Platt, Richard L.: *See—*
Kirschenberg, Bruce H.; and Platt, Richard L., 4,709,692, Cl. 128-78.000.
Platt Saco Lowell Corporation: *See—*
Cooley, Edward J.; and Shaw, Franklin D., 4,709,452, Cl. 19-159.00R.
Play, S. A.: *See—*
Launes, Joaquin J., 4,709,960, Cl. 297-250.000.
Plessey Overseas Limited: *See—*
Field, John R., 4,709,615, Cl. 89-1.560.
Plessner, Karl W.; and Poole, Michael J., to BICC public limited company. Optical cables. 4,709,983, Cl. 350-96.230.
Plum, Helmut, to Hoechst AG. Process for preparing copolymers and use of the products obtained. 4,710,556, Cl. 526-273.000.
Pneumatici Clement S.p.A.: *See—*
Ruscelli, Emilio; Carrera, Cesare; and Formenti, Giuseppe, 4,709,739, Cl. 152-453.000.

Poerink, Nicolaas J. Link conveyor with inserted rods. 4,709,807, Cl. 198-853.000.

Pola Chemical Industries Inc.: *See*—
Takasuka, Yutaka; Mohri, Kunihiko; and Kawaguchi, Akiko, 4,710,375, Cl. 424-69.000.

Polak, Anthony J.; and Beuhler, Allyson J., to UOP Inc. Method and apparatus for separation and purification of hydrogenous compounds with novel membrane. 4,710,278, Cl. 204-129.000.

Polaroid Corporation: *See*—
Alston, Lawrence E., 4,710,824, Cl. 358-310.000.
Hicks, John W., Jr., 4,709,986, Cl. 350-96.330.

Polaroid Corporation, Patent Dept.: *See*—
Stephens, Robert K., 4,710,426, Cl. 428-336.000.

Pollert, Georg, to Bergwerksverband GmbH. Process for the separation of the water resulting during the coking process into a small salt-rich fraction and a large salt-poor fraction. 4,710,302, Cl. 210-696.000.

Polytype AG: *See*—
Neuhaus, Hans, 4,710,358, Cl. 422-186.050.

Pomerantzeff, Oleg, to Eye Research Institute of Retina Foundation. Magnifying ophthalmoscope. 4,710,002, Cl. 351-205.000.

Pool, James R. Cutting apparatus with automatic feed. 4,709,610, Cl. 83-876.000.

Poole, Michael J.: *See*—
Plessner, Karl W.; and Poole, Michael J., 4,709,983, Cl. 350-96.230.

Poortvliet, Robert J.: *See*—
Mitchell, Terry L.; and Poortvliet, Robert J., 4,709,517, Cl. 52-36.000.

Portage Electric Products, Inc.: *See*—
Givler, Omar R., 4,710,743, Cl. 337-380.000.

Posey, John, to Baxter Travenol Laboratories, Inc. Former for form, fill and seal packaging machine. 4,710,157, Cl. 493-213.000.

Postma, Pieter: *See*—
Houkes, Henk; Postma, Pieter; and Van Veghel, Andreas C., 4,710,678, Cl. 315-39.000.

Powell, Harry: *See*—
Wilkins, David R. G.; Brooker, Reginald D.; Walker, Roger; and Powell, Harry, 4,709,630, Cl. 101-93.220.

Powell, Theo J.; Bellay, Jeffrey D.; Daniels, Martin D.; and Hwang, Yin-Chao, to Texas Instruments Incorporated. Parallel/serial scan system for testing logic circuits. 4,710,933, Cl. 371-25.000.

Powell, Theo J.: *See*—
Bellay, Jeffrey D.; and Powell, Theo J., 4,710,931, Cl. 371-25.000.

Powerflow, Inc.: *See*—
Ward, Douglas K.; and Moscovitch, Jerry N., 4,709,938, Cl. 280-154.50R.

Powers, Steven; and Breier, Morton. Variable tensioning mechanism for drum head. 4,709,613, Cl. 84-413.000.

PPG Industries, Inc.: *See*—
Phillips, James G., 4,710,582, Cl. 560-35.000.

Pratt, William K.: *See*—
Wallis, Robert H.; and Pratt, William K., 4,710,813, Cl. 358-136.000.

Pre-Melt Systems, Inc.: *See*—
Areaux, Larry D.; and Dudley, Robert H., 4,710,126, Cl. 432-58.000.

Pregnall, Richard A.: *See*—
Parker, Merle A.; Pregnall, Richard A.; and Ahmed, Hassan J., 4,709,579, Cl. 73-76.000.

Prendergast, Gavan J. J., to Carroll, Noel. Cyclone separator. 4,710,299, Cl. 210-512.100.

Presby, Herman M., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Laser nibbling of optical waveguides. 4,710,605, Cl. 219-121.0LJ.

Preston, Dan C., Jr., to Baker Oil Tools, Inc. High temperature packer for well conduits. 4,709,758, Cl. 166-120.000.

Price, Macy J.; Price, Macy J., Jr.; and Johnson, Mack E., to Engineered Data Products, Inc. Tape cartridge holding case. 4,709,815, Cl. 206-387.000.

Price, Macy J., Jr.: *See*—
Price, Macy J.; Price, Macy J., Jr.; and Johnson, Mack E., 4,709,815, Cl. 206-387.000.

Prime Instruments, Inc.: *See*—
Krupa, Robert L., Jr., 4,710,706, Cl. 324-146.000.

Pringle, Ronald E., to Camco, Incorporated. Variable fluid passageway for a well tool. 4,709,762, Cl. 166-324.000.

Procter & Gamble Company, The: *See*—
Lash, Glen R., 4,710,189, Cl. 604-385.00A.

Protective Treatments, Inc.: *See*—
Gerace, Michael J.; Krysiak, Gary D.; and Schiappacasse, Russell F., 4,710,411, Cl. 428-34.000.

Pruneau, Didier: *See*—
Robin, Jacques; Pruneau, Didier; and Bonenfant, Alain, 4,710,505, Cl. 514-278.000.

Prusman, David. Toy vehicle with self-contained bridge. 4,710,149, Cl. 446-476.000.

Prusoff, William H.: *See*—
Lin, Tai-Shun; and Prusoff, William H., 4,710,492, Cl. 514-50.000.

PruTech II: *See*—
Moreno, Frederick E.; and Hartman, Creighton D., 4,709,643, Cl. 110-336.000.

Purac AB: *See*—
Nordlund, Tore H., 4,710,032, Cl. 366-156.000.

Purification Engineering, Inc.: *See*—
Wood, Louis L.; and Carlton, Gary J., 4,710,467, Cl. 435-108.000.

Quack, Wolfgang, to Dow Chemical Handels-und Vertriebsgesellschaft mbH. Coating composition and its use for the preparation of oxygen barrier coatings on plastic articles. 4,710,413, Cl. 428-36.000.

Quante, Jeffrey B., III; Scoggin, Steven C.; Maxwell, Dennis L.; Rosenkoetter, Marvin W.; and Ferencik, James J., to Norment Industries, Inc. Ballistic and forced entry resistant barrier. 4,709,659, Cl. 109-21.500.

Quantum Diagnostics Ltd.: *See*—
Birnbach, Curtis; and Tanner, Jay, 4,710,939, Cl. 372-73.000.

Quest Medical, Inc.: *See*—
Thompson, Thomas C.; and Harrison, David J., 4,710,166, Cl. 604-81.000.

Quick, Richard L., to Gish Biomedical, Inc. Needle device for use with subcutaneous catheter assemblies. 4,710,176, Cl. 604-177.000.

Quick-Set, Incorporated: *See*—
Mooney, Paul C., 4,709,897, Cl. 248-551.000.

Quist, Gregory M.: *See*—
Wyatt, Philip J.; and Quist, Gregory M., 4,710,025, Cl. 356-343.000.

R. E. Baker Company, Inc.: *See*—
Center, Gene R., 4,709,441, Cl. 15-301.000.

R. J. Harvey Instrument Corporation: *See*—
Maines, Robert, 4,710,458, Cl. 435-12.000.

R. W. Simon Limited: *See*—
South, Alan C., 4,709,809, Cl. 206-162.000.

Raab, Andrew F.; and Habecker, John W., to Indak Manufacturing Corp. Sealed toggle action electrical switches. 4,710,601, Cl. 200-302.300.

Raabe, Austin B., to Applied Biology, Inc. Leak detection method and apparatus. 4,709,576, Cl. 73-40.50R.

Rabajoie, Loick P.: *See*—
Guioth, Chantal H.; Maze, Etienne G.; and Rabajoie, Loick P., 4,710,281, Cl. 204-181.700.

Radian Tool Corporation: *See*—
Headen, James, 4,709,598, Cl. 76-114.000.

Radov, Mitchell C. Satellite earth station. 4,710,778, Cl. 343-882.000.

Raedisch, Dieter: *See*—
Wagenknecht, Juergen; and Raedisch, Dieter, 4,709,843, Cl. 227-156.000.

Rafikian, Faraz; and Rafikian, Manoucher, deceased, to Rafikian, Faraz. Safety lowering or descent parachute system for disabled helicopters and other similar types of hovering aircraft. 4,709,881, Cl. 244-17.150.

Rafikian, Manoucher, deceased: *See*—
Rafikian, Faraz; and Rafikian, Manoucher, deceased, 4,709,881, Cl. 244-17.150.

Rahm, Heiko: *See*—
Erdmann, Hermann; and Rahm, Heiko, 4,710,359, Cl. 422-191.000.

Ramcke, Bernd: *See*—
Ladewig, Dieter; and Ramcke, Bernd, 4,710,256, Cl. 156-484.000.

Ramser, Robert A.: *See*—
Jacoby, John E.; Yu, Ho; and Ramser, Robert A., 4,709,740, Cl. 164-5.000.

Ramunas, Valdas S., to Erickson Tool Company. Locking tool holder. 4,710,077, Cl. 409-232.000.

Rannigan, Robert C.; and Webber, Gregory E. Cleaning apparatus for paint rollers and the like. 4,709,717, Cl. 134-199.000.

Rao, R. Nagaraja: *See*—
Belagaje, Ramamoorthy; Kuhstoss, Stuart A.; and Rao, R. Nagaraja, 4,710,464, Cl. 435-91.000.

Raschack, Manfred: *See*—
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, 4,710,496, Cl. 514-183.000.

Rasmussen, Russell G.; Stubenfoll, Leonard J.; and Disko, Harry, to Marvin Glass & Associates. Projectile propelling attachment for toy figures. 4,710,146, Cl. 446-308.000.

Rasmussen, Russell G.: *See*—
Breslow, Jeffrey D.; Morrison. Howard J.; Hanson, Steven P.; and Rasmussen, Russell G., 4,710,873, Cl. 364-410.000.

Rast, Robert M., to American Television & Communications Corporation. Cable television system. 4,710,956, Cl. 380-20.000.

Rat, Pierre: *See*—
Lebas, Jean-Marie; Rat, Pierre; Dupont, Jean-Marcel; and Vinuesa, Germain, 4,710,329, Cl. 264-3.100.

Rattunde, Manfred, to Reimers Getriebe AG. Plate link chain for cone pulley drives. 4,710,154, Cl. 474-242.000.

Raue, Roderich: *See*—
Franke, Gunter; Ockelmann, Dieter; Raue, Roderich; and Wild, Peter, 4,710,569, Cl. 544-31.000.

Raush, Russell G.; and Alleman, Raymond A., to RCA Corporation. Rinse tank. 4,709,716, Cl. 134-122.00R.

Rautio, Kauko. Saw machine. 4,709,609, Cl. 83-435.200.

Raven, Johannes G.: *See*—
Warmuth, Otto L.; Johanndeiter, Martin H.; and Raven, Johannes G., 4,710,802, Cl. 358-25.000.

Rawdon, Albert H., to Riley Stoker Corporation. Fluidized bed heat generator and method of operation. 4,709,662, Cl. 122-4.00D.

Ray, Francis M.: *See*—
Knowles, Terence J.; Ray, Francis M.; and Shewey, Charles E., 4,710,707, Cl. 324-158.00F.

Raychaudhuri, Pranab K., to Eastman Kodak Company. Thin film amorphous optical recording films. 4,710,452, Cl. 430-495.000.

Raychem Limited: *See*—
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., 4,709,948, Cl. 285-381.000.

Raytheon Company: *See*—
Cantwell, Robert H.; Marksteiner, William K.; and Hansen, V. Gregers, 4,710,772, Cl. 342-92.000.
Lewis, Edward T., 4,710,649, Cl. 307-451.000.

RCA Corporation: *See*—
Del Priore, Paul J., 4,710,440, Cl. 430-5.000.
Dennis, Timothy A., 4,710,261, Cl. 156-626.000.
Fling, Russell T., 4,710,892, Cl. 364-729.000.
Nossen, Edward J., 4,710,944, Cl. 375-40.000.
Raush, Russell G.; and Alleman, Raymond A., 4,709,716, Cl. 134-122.00R.
Samuels, Gerard; and Smith, Paul R., 4,709,632, Cl. 101-163.000.
Woestman, John W., 4,709,633, Cl. 101-163.000.
Yakmovitz, Kenneth J., 4,709,733, Cl. 140-147.000.

Ream, James C.: *See*—
Sabroff, Alvin M.; Chambers, Samuel C.; and Ream, James C., 4,709,569, Cl. 72-340.000.

Recker, Robert R. Treatment for osteoporosis using hGRF(1-40)NH_2. 4,710,382, Cl. 424-108.000.

Reed, Phillip J.: *See*—
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., 4,710,594, Cl. 174-120.0SR.

Regiert, Marlies: *See*—
Hafner, Walter; Ritter, Peter; Gebauer, Helmut; and Regiert, Marlies, 4,710,316, Cl. 512-20.000.

Rehau AG & Co.: *See*—
Zwilling, Hermann, 4,709,730, Cl. 138-111.000.

Reichert, Karl-Heinz; and Koschinski, Ingo, to Bayer Aktiengesellschaft. Fibre-reinforced or filled polyphenylene sulphide containing treated aramide fibers. 4,710,546, Cl. 525-420.000.

Reichert, William W.; Cody, Charles A.; Desesa, Michael A.; and Faulseit, Bruce K., to NL Chemicals, Inc. Solvent-free coating composition and process for protecting a surface from corrosion. 4,710,404, Cl. 427-386.000.

Reid, Bruce A.; and Deline, John R. M., to NCR Corporation. Closed-loop control system for a stepping motor. 4,710,690, Cl. 318-685.000.

Reid, Stephen R., to Westinghouse Electric Corp. Dynamoelectric machine coil slot wedge mounting arrangement. 4,710,663, Cl. 310-214.000.

Reifel, Allan J., to Nordyne, Inc. Uni-directional fin-and-tube heat exchanger. 4,709,753, Cl. 165-125.000.

Reifel, Allan J.; and Roth, James E., to Nordyne, Inc. Electric resistance heater and limit switch assembly. 4,710,610, Cl. 219-363.000.

Reimers Getriebe AG: *See*—
Rattunde, Manfred, 4,710,154, Cl. 474-242.000.

Reinelt, Karlheinz: *See*—
Mueller, Dietmar; and Reinelt, Karlheinz, 4,709,636, Cl. 102-431.000.

Reiner, Josef: *See*—
Spitznas, Manfred; Reiner, Josef; Veit, Wolfgang; and Kirchhuebel, Rainer, 4,710,000, Cl. 350-516.000.

Reinhardt, Rudolf. Assembly for mounted components with snap-action. 4,710,853, Cl. 361-391.000.

Renner, Gunter: *See*—
Langen, Hans; Schutz, Heinz-Dieter; Himmelmann, Wolfgang; Wernicke, Ubbo; and Renner, Gunter, 4,710,454, Cl. 430-546.000.

Resca, Franco. Handgun frame with fixed barrel bushing. 4,709,497, Cl. 42-75.020.

Rescalli, Carlo: *See*—
Gazzi, Luigi; and Rescalli, Carlo, 4,710,210, Cl. 62-17.000.
Gazzi, Luigi; and Rescalli, Carlo, 4,710,211, Cl. 62-17.000.

Research Development Corporation of Japan: *See*—
Yamaguchi, Youko; Shimizu, Hiroshi; Tsuda, Ichiro; Yano, Masafumi; and Okumura, Tokiko, 4,710,964, Cl. 382-17.000.

Research Foundation of State University of New York, The: *See*—
Beachley, Orville T., Jr., 4,710,575, Cl. 556-1.000.

Rettke, Wilfried: *See*—
Moritz, Manfred; and Rettke, Wilfried, 4,710,042, Cl. 400-141.000.

Revere Copper and Brass Incorporated: *See*—
Chapman, James B., 4,710,120, Cl. 425-185.000.

Reyher, Manfred: *See*—
Rother, Helmut; and Reyher, Manfred, 4,709,856, Cl. 238-10.00E.

Reynolds, Charles P.: *See*—
Saur, Joseph W.; Reynolds, Charles P.; and Black, Alfred T., 4,710,472, Cl. 435-287.000.

Reynolds Metals Company: *See*—
Lindstrom, Donald E.; and Setzer, David T., 4,710,068, Cl. 406-88.000.

Rheinisch-Westfalisches Elektrizitatswerk Aktiengesellschaft: *See*—
Gebhard, Georg R. U.; Hein, Klaus R. G.; and Glaser, Wolfgang, 4,710,365, Cl. 423-244.000.

Rheinmetall GmbH: *See*—
Bartolles, Rolf, 4,709,616, Cl. 89-26.000.
Klumpp, Walter, 4,709,614, Cl. 89-1.350.
Mueller, Dietmar; and Reinelt, Karlheinz, 4,709,636, Cl. 102-431.000.

Rhoads, Robert E.: *See*—
Kozarich, John W.; and Rhoads, Robert E., 4,710,566, Cl. 536-28.000.

Rhone-Poulenc Fibres: *See*—
Perrot, Pierre; and Vuillemey, Georges, 4,710,535, Cl. 524-413.000.

Ribich, William A.: *See*—
Harvey, Andrew C.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,709,453, Cl. 24-442.000.

Ricardo Consulting Engineers plc: *See*—
Monaghan, Michael L., 4,709,676, Cl. 123-383.000.

Rice, Lawrence M.: *See*—
Morris, Merle E.; Rice, Lawrence M.; and Meade, Steven L., 4,710,676, Cl. 313-579.000.

Rich, Brian G.; Patchell, John W.; and Harman, R. Keith, to Senstar Security Systems Corporation. Security system transmission line. 4,710,753, Cl. 340-561.000.

Richards, Elmer A., to Eaton Corporation. Herringbone geared multiple load sharing countershaft transmission. 4,709,590, Cl. 74-331.000.

Richards, John S.: *See*—
Kubert, Vince T.; and Richards, John S., 4,709,635, Cl. 101-426.000.

Richards, Randall G., to Drackett Company, The. Toilet tank dispenser. 4,709,423, Cl. 4-228.000.

Richter Gedeon Vegyeszeti Gyar Rt: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Ricoh Company, Ltd.: *See*—
Imamura, Tomotsu, 4,710,622, Cl. 250-214.00R.
Kobayashi, Kiyohiko, 4,710,965, Cl. 382-41.000.
Takeda, Fuchio; Matsushiro, Hiroyuki; Kobayashi, Kazuo; and Kaneko, Toshio, 4,710,015, Cl. 355-3.0DD.

Ricoh Systems, Inc.: *See*—
Koelling, Alan L.; Murphy, William J.; and Mayer, Edward F., 4,710,442, Cl. 430-85.000.

Rider, Jack A.: *See*—
Krause, Larry J.; and Rider, Jack A., 4,710,403, Cl. 427-304.000.

Rienecker, Reimund: *See*—
Henrich, Hans-Otto; and Rienecker, Reimund, 4,710,287, Cl. 209-270.000.

Ries, Joachim; and Dorgeloh, K. Heinrich W., to Deutsche Forschungs-und Versuchsanstalt fur Luft- und Raumfahrt e.V. Method for the representation of video images or scenes, in particular aerial images transmitted at reduced frame rate. 4,710,809, Cl. 358-109.000.

Rieter Machine Works, Ltd.: *See*—
Schefer, Kurt, 4,709,866, Cl. 242-18.00A.

Riker Laboratories, Inc.: *See*—
Kirk, Alan R.; and Scherrer, Robert A., 4,710,515, Cl. 514-563.000.

Riley Stoker Corporation: *See*—
Larson, John W.; and Breault, Ronald W., 4,709,663, Cl. 122-4.00D.
Rawdon, Albert H., 4,709,662, Cl. 122-4.00D.

Rilly, Gerard, to Deutsche Thomson-Brandt GmbH. D.C. to D.C. converter with a switch-mode power supply. 4,710,859, Cl. 363-21.000.

Rindal, Roald A.; and McKee, Bobby D., to Westinghouse Electric Corp. Homopolar generator with variable packing factor brushes. 4,710,666, Cl. 310-248.000.

Rink, Frederick J., Jr.: *See*—
Cox, Frederick E.; Rink, Frederick J., Jr.; and Valachovic, Richard A., 4,710,664, Cl. 310-217.000.

Riquart, Christian: *See*—
Sauvee, Jean P.; Riquart, Christian; and Levrai, Roland, 4,709,550, Cl. 60-562.000.

Ritchie, Ian T.; and Kittler, Wilfred C., to Andus Corp. Stable high resistance transparent coating. 4,710,441, Cl. 430-62.000.

Ritsko, Joseph E.; and Acla, Howard L., to GTE Products Corporation. High purity high surface area alpha crystalline silicon nitride. 4,710,368, Cl. 423-344.000.

Rittal-Werk Rudolf Loh GmbH & Co KG: *See*—
Erlam, David P., 4,710,096, Cl. 415-121.00G.

Ritter, Peter: *See*—
Hafner, Walter; Ritter, Peter; Gebauer, Helmut; and Regiert, Marlies, 4,710,316, Cl. 512-20.000.

Rittman, Friedrich: *See*—
Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, 4,710,607, Cl. 219-121.00P.

Roag (AG): *See*—
Suter, Hans R., 4,710,199, Cl. 8-507.000.

Robert Bosch GmbH: *See*—
Babitzka, Rudolf, 4,709,673, Cl. 123-299.000.
Haug, Kurt; and Peterssen, Rudolf, 4,710,857, Cl. 362-80.000.
Heess, Gerhard; and van Zanten, Anton, 4,709,969, Cl. 303-114.000.
Kaiser, Gunther; and Krauter, Immanuel, 4,709,684, Cl. 123-644.000.
Merkus, Minne, 4,709,528, Cl. 53-128.000.

Roberts, Arthur: *See*—
Leeds, Richard; and Roberts, Arthur, 4,709,971, Cl. 312-201.000.

Roberts, David A.: *See*—
Campbell, Simon F.; and Roberts, David A., 4,710,507, Cl. 514-312.000.

Roberts, Richard A.: *See*—
Hazlegrove, Billy M.; and Roberts, Richard A., 4,710,059, Cl. 405-162.000.

Roberts, Rowena L.: *See*—
Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., 4,710,583, Cl. 560-40.000.

Roberts, Simon. Tire repair method. 4,710,249, Cl. 156-64.000.

Roberts, William N., to Zenith Electronics Corporation. Single layer optical coupler for projection TV CRT. 4,710,820, Cl. 358-231.000.

Robieux, Jean, to Compagnie General d'Electricite. Optical fiber telecommunication device. 4,710,914, Cl. 370-3.000.

Robin, Jacques; Pruneau, Didier; and Bonenfant, Alain, to Societe de Recherches Industrielles (S.O.R.I.). Asymmetric heterocyclic ester derivatives of 1,4-dihydropyridine-3,5-dicarboxylic acids. 4,710,505, Cl. 514-278.000.

Robotic Vision System, Inc.: *See*—
Stern, Howard; Mauro, Alex; and Lee, Jay, 4,709,858, Cl. 239-296.000.

Rochester, Charles R., Jr., to Unisys Corporation. EMI/RFI shielding assembly for cathode ray tube monitors. 4,710,591, Cl. 174-35.0GC.

Rockwell International Corporation: *See*—
Matejczyk, Daniel E., 4,710,223, Cl. 75-248.000.
Momot, Stanley; and Hannon, William G., 4,709,634, Cl. 101-248.000.
Rosman, Irwin E., 4,710,332, Cl. 264-60.000.
Warren, Leslie F., Jr.; Maus, Louis; and Hall, William F., 4,710,401, Cl. 427-121.000.

Rodgers, Donald H.: *See*—
Bodovsky, Paul W.; and Rodgers, Donald H., 4,710,207, Cl. 55-290.000.

Roederer, Antoine G.; Doro, Guilio; and Lisi, Marco, to Agence Spatiale Europeenne. Power divider for multibeam antennas with shared feed elements. 4,710,776, Cl. 343-778.000.

Roether, Kurt, to Manneamann AG. Method of making tubular units for the oil and gas industry. 4,710,245, Cl. 148-12.400.

Rogers, Donald: *See*—
Howe, Stephen H.; and Rogers, Donald, 4,710,259, Cl. 156-601.000.

Rogers, John M. Apparatus for milling exterior surfaces and refacing both shoulders of a two-shoulder tool joint. 4,709,604, Cl. 82-4.00C.

Rohm GmbH: *See*—
Kraemer, Dieter; Siol, Werner; Markert, Gerhard; Suetterlin, Norbert; and Feil, Cornelia, 4,710,525, Cl. 523-201.000.

Rohr, Robert D.: *See*—
Beck, James M.; and Rohr, Robert D., 4,709,823, Cl. 215-235.000.

Ropol, Inc.: *See*—
Gleaves, Geoffrey H., 4,709,516, Cl. 52-11.000.

Rorden, Louis H.; and Moore, Thomas C., to Develco. Method and apparatus employing received independent magnetic field components of a transmitted alternating magnetic field for determining location. 4,710,708, Cl. 324-207.000.

Rosch, Werner: *See*—
Batza, Willi; and Rosch, Werner, 4,710,203, Cl. 55-2.000.

Rosenberg, Helmut W. G., to Kendall Company, The. Needle depth setting sheath assembly and needle stop. 4,710,171, Cl. 604-117.000.

Rosenkoetter, Marvin W.: *See*—
Quante, Jeffrey B., III; Scoggin, Steven C.; Maxwell, Dennis L.; Rosenkoetter, Marvin W.; and Ferencik, James J., 4,709,659, Cl. 109-21.500.

Rosman, Irwin E., to Rockwell International Corporation. Process of injection molding a laser mirror substrate. 4,710,332, Cl. 264-60.000.

Rossetti, James J., to Advanced Tool Technology, Inc. Method of preparing a template. 4,710,334, Cl. 264-102.000.

Rossi, Irving. Process and apparatus for making thin steel slabs. 4,709,745, Cl. 164-484.000.

Rossman, Axel, to Motoren-und Turbinen-Union Munchen, GmbH. Method for manufacturing powder material and shaped products utilizing the conditions in outer space. 4,710,346, Cl. 419-68.000.

Roth, Bernard: *See*—
Luckey, George W.; Roth, Bernard; Brendel, Kathleen E.; and Den Dunne, Margaret S., 4,710,637, Cl. 250-486.100.

Roth, James E.; and Bales, David W., to Nordyne, Inc. Ceiling distributor duct assembly for rooftop air conditioners. 4,709,623, Cl. 98-40.050.

Roth, James E.: *See*—
Reifel, Allan J.; and Roth, James E., 4,710,610, Cl. 219-363.000.

Rother, Helmut; and Reyher, Manfred, to Gebr. Marklin & Cie. GmbH. Electrical and mechanical coupling for model rail sections. 4,709,856, Cl. 238-10.00E.

Rotman, Avner. Sustained release tablets made from microcapsules. 4,710,384, Cl. 424-465.000.

Roucache, Jeannine: *See*—
Behar, Francoise; Roucache, Jeannine; Auger, Jean; and Boudet, Luc, 4,710,354, Cl. 422-80.000.

Rowe, James M.; and Modster, Rudolph W., to Northrop Corporation. Transparent conductive windows, coatings, and method of manufacture. 4,710,433, Cl. 428-623.000.

Rozlosnik, Alan J.: *See*—
Anders, Walter G.; Grosswiller, Leo J., Jr.; Lozier, Benjamin F.; and Rozlosnik, Alan J., 4,710,098, Cl. 415-149.00A.

Rozsas, Tomas, to Volkswagen AG. Fuel injection device. 4,709,681, Cl. 123-531.000.

Rubin, Michael D.: *See*—
Crill, Philip D.; and Rubin, Michael D., 4,710,733, Cl. 332-26.000.

Rucker, Robert A. Refractory cement. 4,710,225, Cl. 106-104.000.

Rudick, Arthur G.; and Credle, William S., Jr., to Coca-Cola Company, The. Method and system for filling packages with a carbonated beverage pre-mix under micro-gravity conditions. 4,709,734, Cl. 141-2.000.

Rudolph, Hans: *See*—
Meier, Helmut-Martin; Heine, Hans-Georg; Pischtschan, Alfred; Dhein, Rolf; and Rudolph, Hans, 4,710,529, Cl. 524-139.000.

Ruebsamen, Klaus: *See*—
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, 4,710,496, Cl. 514-183.000.

Ruhrchemie Aktiengesellschaft: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,710,321, Cl. 200-501.150.

Rullier, Pierre: *See*—
Dimier, Jean-Pierre; and Rullier, Pierre, 4,709,942, Cl. 280-618.000.

Runeman, Bo, to Molnlycke AB. Incontinence protector and a method for its manufacture. 4,710,188, Cl. 604-385.00R.

Ruscelli, Emilio; Carrera, Cesare; and Formenti, Giuseppe, to Pneumatici Clement S.p.A. Universal tubular-tire for bicycles. 4,709,739, Cl. 152-453.000.

Russell, Philip B.: *See*—
Matsumoto, Yutaka; Mina, Cesar; Russell, Philip B.; and van Ark, William B., 4,710,618, Cl. 250-203.00R.

Russo, Onofrio N., to Gas Energy, Inc. Automatically locking valve. 4,709,720, Cl. 137-385.000.

Rutschmann, Erwin; Tran-Van, Khanh; and Wagner, Joachim, to Dr.Ing.h.c.F. Porsche Aktiengesellschaft. Multiple cylinder internal combustion engine with exhaust turbochargers. 4,709,552, Cl. 60-600.000.

Rutt, Thomas E., to Aardvark Audio Inc. Nonlinear distortion synthesizer using over-threshold power-function feedback. 4,710,727, Cl. 330-110.000.

Ruxley Holdings Ltd.: *See*—
Loveridge, Ronald, 4,710,023, Cl. 356-124.000.

Ryobi, Ltd.: *See*—
Murakami, Hideo, 4,709,874, Cl. 242-220.000.
Uetsuki, Haruo; Kobayashi, Takehiro; and Yamane, Hiroto, 4,710,689, Cl. 318-630.000.

Rytand, David H. Floating dock. 4,709,647, Cl. 114-267.000.

Saalbach, Kurt; and Hartmann, Willi, to Alfred Teves GmbH. Pressure cylinder and method of adjusting idle travel. 4,709,551, Cl. 60-589.000.

Sabroff, Alvin M.; Chambers, Samuel C.; and Ream, James C., to Eaton Corporation. Method for producing gears. 4,709,569, Cl. 72-340.000.

Sadler, Karl-Otto; Schmidt, Willy; and Franz, Hans-Joachim, to Blohm & Voss AG. Functional unit installation in a warship. 4,709,646, Cl. 114-5.000.

Safety 1st, Inc.: *See*—
Lerner, Michael; Bernstein, Michael; and Selame, Robert, 4,709,429, Cl. 4-661.000.

SAFT, S.A.: *See*—
Leben, Yannick; and D'Ussel, Louis, 4,710,438, Cl. 429-119.000.

Sagawa, Masato: *See*—
Yamagishi, Wataru; and Sagawa, Masato, 4,710,242, Cl. 148-301.000.

Sagawa, Takatoshi: *See*—
Kai, Yasuaki; Sagawa, Takatoshi; and Tabata, Hiroshi, 4,709,988, Cl. 350-276.00R.

Sagawa, Takayoshi: *See*—
Hirose, Ichiro; and Sagawa, Takayoshi, 4,709,711, Cl. 131-336.000.

Saiki, Eisaku; and Kawauchi, Masataka, to Hitachi, Ltd. Automatic sheet feeding device. 4,709,911, Cl. 271-10.000.

Saito, Goro: *See*—
Itaya, Hiroshi; and Saito, Goro, 4,710,702, Cl. 324-79.00R.
Nakamura, Junji; Nishimura, Ikuma; Saito, Goro; and Matsumoto, Kozo, 4,710,436, Cl. 429-41.000.

Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, to Nihon Tokushu Noyaku Seizo K. K. Substituted phenylsulfonylazoles. 4,710,509, Cl. 514-384.000.

Saito, Kenichiro: *See*—
Heller, Jorge; Skinner, Wilfred A.; Saito, Kenichiro; and Satoh, Susumu, 4,710,497, Cl. 514-221.000.

Saito, Koichi; Fujimura, Yoshihiko; and Inoue, Nanao, to Fuji Xerox Co., Ltd. Recorder with simultaneous application of thermal and electric energies. 4,710,780, Cl. 346-1.100.

Saito, Masatoshi: *See*—
Imai, Akio; Okamoto, Yasushi; and Saito, Masatoshi, 4,710,554, Cl. 526-180.000.

Saito, Naoyuki; and Ozawa, Motoo, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 4,709,774, Cl. 180-229.000.

Saito, Shinji: *See*—
Ono, Toshio; Tamai, Yasuo; Mizuno, Chiaki; Ogawa, Hiroshi; and Saito, Shinji, 4,710,421, Cl. 428-213.000.

Saito, Yukio: *See*—
Shimaoka, Motohiro; and Saito, Yukio, 4,710,829, Cl. 360-97.000.

Saitoh, Takashi; Niizaki, Nobuya; Yamamura, Hideho; and Hayashi, Shinichi, to Hitachi, Ltd.; and Hitachi Electronics Engineering Co., Ltd. Delay circuit including an improved CR integrator circuit. 4,710,654, Cl. 307-601.000.

Sajur, Eugene V.: *See*—
Allen, Ronald C.; and Sajur, Eugene V., 4,710,206, Cl. 55-58.000.

Sakai, Shino; and Nishikawa, Masao, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling creep preventing device for vehicle equipment with automatic transmission. 4,709,792, Cl. 192-0.044.

Sakai, Yasuhito, to Fuji Jukogyo Kabushiki Kaisha. System for controlling the pressure of oil in a system for a continuously variable transmission. 4,710,151, Cl. 474-28.000.

Sakakibara, Shiro; and Ozaki, Kazuhisa, to Aisin-Warner Limited. Parking mechanism for transmissions. 4,709,793, Cl. 192-4.00A.

Sakakibara, Yasuji: *See*—
Yoneda, Takao; Ogasawara, Tadashi; Ohta, Norio; and Sakakibara, Yasuji, 4,709,509, Cl. 51-165.710.

Sakamoto, Fujio, to Toyoda Gosei Co., Ltd. Wheel cap. 4,709,967, Cl. 301-37.00P.

Sakamoto, Shoichi: *See*—
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, 4,709,816, Cl. 206-444.000.

Sakanoue, Hitoyuki: *See*—
Sekiguchi, Yukio; Funakubo, Hiroyasu; Sakanoue, Hitoyuki; and Komura, Osamu, 4,709,844, Cl. 228-3.100.

Sakashita, Tsutomu: *See*—
Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Maehara, Yasuhiro; and Yasumoto, Kunio, 4,709,572, Cl. 72-366.000.

Sakawa, Shinji: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Kagabu, Shinzo; Sakawa, Shinji; and Moriya, Koichi, 4,710,518, Cl. 514-624.000.

Sakurai, Hiroshi: *See*—
Matsuura, Hitoshi; and Sakurai, Hiroshi, 4,709,482, Cl. 33-1.00M.

Sakurai, Keiichi, to Casio Computer Co., Ltd. Apparatus with liquid crystal display panel, for recording/playing back television signal by utilizing digital audio tape recorder system. 4,710,826, Cl. 360-9.100.

Salandanan, Carmelita S.: *See*—
Patel, Arvind D.; and Salandanan, Carmelita S., 4,710,586, Cl. 560-68.000.

Saller, Henry A., deceased (by Saller, Marjorie, executrix); Hodge, Edwin S.; Paprocki, Stanley J.; and Dayton, Russell W., to United States of America, Energy. Method of bonding. 4,709,848, Cl. 228-159.000.

Saller, Marjorie, executrix: *See*—
Saller, Henry A., deceased; Hodge, Edwin S.; Paprocki, Stanley J.; and Dayton, Russell W., 4,709,848, Cl. 228-159.000.

Salley, Frank. Rotary air lock feeder. 4,710,067, Cl. 406-64.000.

Salo, Timo: *See*—
Alsen, Per; and Salo, Timo, 4,710,070, Cl. 408-93.000.

Salomon, Lothar H. Mechanical fluid indicator. 4,709,653, Cl. 116-228.000.

Salomon S.A.: *See*—
Dimier, Jean-Pierre; and Rullier, Pierre, 4,709,942, Cl. 280-618.000.
Morell, Joseph; De Marchi, Jean-Louis; and Kopp, Norbert, 4,709,491, Cl. 36-121.000.

Samuels, Gerard; and Smith, Paul R., to RCA Corporation. Selective intaglio inking device with removable cartridge. 4,709,632, Cl. 101-163.000.

Sand, Theodor: *See*—
Bruning, Jurgen; Emberger, Roland; Hopp, Rudolf; and Sand, Theodor, 4,710,392, Cl. 426-534.000.

Sanders Associates, Inc.: *See*—
Kuppenheimer, John D., Jr.; and Smith, Kirby A., 4,710,630, Cl. 250-353.000.
Sciacero, James R.; and Pardee, Douglas L., 4,710,767, Cl. 340-799.000.

Sanders, James F., to Minnesota Mining and Manufacturing Company. Resist imageable photopolymerizable compositions. 4,710,445, Cl. 430-252.000.

Sangamo Weston, Inc.: *See*—
Stephenson, Kenneth E., 4,710,675, Cl. 313-532.000.

Sankey, James K.: *See*—
Hehn, Bruce A.; and Sankey, James K., 4,709,437, Cl. 15-97.00R.

Sano, Shoichi: *See*—
Tashiro, Yutaka; and Sano, Shoichi, 4,709,936, Cl. 280-91.000.

Sanofi: *See*—
Wermuth, Camille G.; and Chambon, Jean-Pierre, 4,710,499, Cl. 514-247.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Sumigawa, Yukio, 4,709,671, Cl. 123-196.00S.

Santen, Sven; Eriksson, Sven; and Bernhard, Ragnar, to SKF Steel Engineering AB. Recovering chemicals from spent pulp liquors. 4,710,269, Cl. 162-30.100.

Sanyo Chemical Industries, Ltd.: *See*—
Noda, Kimihiko; Fujiura, Yoji; and Hasegawa, Yoichi, 4,710,298, Cl. 210-505.000.

Sanyo Electric Co., Ltd.: *See*—
Machida, Toyoji; and Ueno, Shyuichi, 4,709,472, Cl. 29-623.000.

Sapp, Charles E. Clock with calendar notepad. 4,709,493, Cl. 40-117.000.

Sapper, Rainer; and Kick, Helmut, to Linde Aktiengesellschaft. Process for separating CO_2 from a gaseous mixture. 4,710,213, Cl. 62-28.000.

Sarin, Vinod K.: *See*—
Baldoni, J. Gary, II; Buljan, Sergej-Tomislav; and Sarin, Vinod K., 4,710,425, Cl. 428-328.000.

Sasaguri, Nobuya: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Sasaki, Shinji; Shimoyama, Yujiro; and Watanabe, Yoshinori, to Alps Electric Co., Ltd. Detent mechanism for sliding electric parts. 4,710,600, Cl. 200-291.000.

Sasamori, Eizo: *See*—
Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, 4,710,418, Cl. 428-192.000.

Satake, Masaki: *See*—
Naoi, Takashi; Fujioka, Takashi; Okamura, Hisashi; and Satake, Masaki, 4,710,456, Cl. 430-564.000.

Sato, Fumihiro: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,710,517, Cl. 514-616.000.

Sato, Kazuhiro: *See*—
Noda, Naoki; Nihashi, Iwao; and Sato, Kazuhiro, 4,710,608, Cl. 219-161.000.

Sato, Kichihei: *See*—
Tamamizu, Teruyasu; Sato, Kichihei; Tanaka, Takashi; and Sato, Shunkichi, 4,710,428, Cl. 428-408.000.

Sato, Makoto: *See*—
Iwasaki, Tadayoshi; Ariga, Keiki; and Sato, Makoto, 4,709,578, Cl. 73-49.300.

Sato, Masanori: *See*—
Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, 4,710,215, Cl. 62-532.000.

Sato, Noboru; Habu, Kazutaka; and Abe, Sanae, to Sony Corporation. Optomagnetic recording medium. 4,710,434, Cl. 428-678.000.

Sato, Shunkichi: *See*—
Tamamizu, Teruyasu; Sato, Kichihei; Tanaka, Takashi; and Sato, Shunkichi, 4,710,428, Cl. 428-408.000.

Sato, Toshifumi, to NEC Corporation. Speech-adaptive predictive coding system having reflected binary encoder/decoder. 4,710,960, Cl. 381-47.000.

Satoh, Susumu: *See*—
Heller, Jorge; Skinner, Wilfred A.; Saito, Kenichiro; and Satoh, Susumu, 4,710,497, Cl. 514-221.000.

Satou, Takashi: *See*—
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Saur, Joseph W.; Reynolds, Charles P.; and Black, Alfred T., to United States of America, Navy. Magnetic separation device. 4,710,472, Cl. 435-287.000.

Sauvee, Jean P.; Riquart, Christian; and Levrai, Roland, to Societe Anonyme D.B.A. Hydraulic assistance device. 4,709,550, Cl. 60-562.000.

Saveliev, Vyacheslav N.: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.

Savoie, Neil A. Portable cabinet. 4,709,970, Cl. 312-140.400.

Sawada, Masahiro: *See*—
Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, 4,710,684, Cl. 318-254.000.
Okita, Masaya; Sawada, Masahiro; and Ota, Tadashi, 4,710,825, Cl. 358-342.000.

Sawaf, Bernard E.: *See*—
Harvey, Andrew C.; Ribich, William A.; Marinaccio, Paul J.; and Sawaf, Bernard E., 4,709,453, Cl. 24-442.000.

Sawafuji Electric Co., Inc.: *See*—
Takano, Masami; and Tamura, Yukio, 4,710,659, Cl. 310-153.000.

Sawaragi, Hiroshi, to Jeol Ltd. Ion beam lithography system. 4,710,639, Cl. 250-492.200.

Sayama, Haruo: *See*—
Shimada, Mitsuhiro; Matsumoto, Junichiro; Nonaka, Susumu; and Sayama, Haruo, 4,710,041, Cl. 400-120.000.

Scarborough, Randolph G., to International Business Machines Corporation. Method for vectorizing and executing on an SIMD machine outer loops in the presence of recurrent inner loops. 4,710,872, Cl. 364-300.000.

Schad, Hans P.; and Kelly, Stephen M., to Merck Patent Gesellschaft mit beschrankter Haftung. Anisotropic compounds and liquid crystal mixtures therewith. 4,710,315, Cl. 252-299.630.

Schaeffler, George: *See*—
Klug, Horst; Mocker, Wolfgang; Schaeffler, George; and Speil, Walter, 4,709,668, Cl. 123-90.550.

Schaetzler, Walter: *See*—
Paerisch, Jochen; Herlemann, Werner; and Schaetzler, Walter, 4,709,959, Cl. 296-217.000.

Schaffel, Neal A.: *See*—
Lee, Robert W.; and Schaffel, Neal A., 4,710,239, Cl. 148-101.000.

Schaffer, Dennis A.: *See*—
Valencic, Milan D.; and Schaffer, Dennis A., 4,709,471, Cl. 29-605.000.

Schat, Hermannus: *See*—
Gassmann, Gerhard G.; Schat, Hermannus; Elmis, Herbert; Novotny, Bernd; Kappeler, Otmar; and Ehrhardt, Dietmar, 4,710,814, Cl. 358-143.000.

Schatz, Oskar. Internal combustion engine with a positive displacement supercharger mechanically driven from the engine crankshaft. 4,709,683, Cl. 123-560.000.

Schaumann, Wolfgang: *See*—
Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, 4,710,510, Cl. 514-394.000.

Schefer, Kurt, to Rieter Machine Works, Ltd. Thread guiding and screening element for use in filament winder. 4,709,866, Cl. 242-18.00A.

Schelby, Robert L.: *See*—
Tucker, James L.; Landen, Terry R.; and Schelby, Robert L., 4,710,115, Cl. 425-117.000.

Scheller, Hans-Ulrich, to Wurttembergische Parfumerie-Fabrik GmbH. Dentifrice for hypersensitive teeth. 4,710,372, Cl. 424-49.000.

Schemmann, Hugo: *See*—
Schroder, Johann; Gawron, Klaus; Bertram, Leo; and Schemmann, Hugo, 4,709,752, Cl. 165-47.000.

Schenk Filterbau Gesellschaft mit beschrankter Haftung: *See*—
Ziller, Josef, 4,710,294, Cl. 210-232.000.

Schenkel, Robert H.; Wong, Rosie B.; and Thammana, Pallaiah, to American Cyanamid Company. Antigens and monoclonal antibodies reactive against sporozoites of *Eimeria spp.* 4,710,377, Cl. 424-88.000.
Schering Agrochemicals Limited: *See*—
Webb, Michael A., 4,710,512, Cl. 514-431.000.
Scherrer, Robert A.: *See*—
Kirk, Alan R.; and Scherrer, Robert A., 4,710,515, Cl. 514-563.000.
Scherzer, Wilhelm, to Austria Metall Aktiengesellschaft. Sound-damping and heat-insulating composite plate. 4,709,781, Cl. 181-290.000.
Schiappacasse, Russell F.: *See*—
Gerace, Michael J.; Krysiak, Gary D.; and Schiappacasse, Russell F., 4,710,411, Cl. 428-34.000.
Schillinger, Daniel: *See*—
Kaufmann, Felix; and Schillinger, Daniel, 4,710,863, Cl. 364-146.000.
Schingnitz, Manfred: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.
Schlechtriemen, Gerhard-Ludwig; Hotzel, Gerhard; and Weppner, Werner, to Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Solid state cell. 4,710,848, Cl. 361-280.000.
Schmetz GmbH & Co. KG: *See*—
Schmetz, Peter, 4,709,904, Cl. 266-250.000.
Schmetz, Peter, to Schmetz GmbH & Co. KG. Vacuum furnace for heat-treating a charge. 4,709,904, Cl. 266-250.000.
Schmidt, Douglass N.: *See*—
Finnan, Jeffrey L.; Lisa, Rudolph E.; and Schmidt, Douglass N., 4,710,519, Cl. 514-629.000.
Schmidt, Martin: *See*—
Dotzauer, Peter; and Schmidt, Martin, 4,709,559, Cl. 62-499.000.
Schmidt, Willy: *See*—
Sadler, Karl-Otto; Schmidt, Willy; and Franz, Hans-Joachim, 4,709,646, Cl. 114-5.000.
Schmied, Bernhard: *See*—
Geiss, Karl-Heinz; Schmied, Bernhard; Raschack, Manfred; Lehmann, Hans-Dieter; Gries, Josef; and Ruebsamen, Klaus, 4,710,496, Cl. 514-183.000.
Schmukler, Charles S.; and Buon, Georges A., to Marine Moisture Control Company, Inc. Method and apparatus for determining the degree of purity of a liquid. 4,710,643, Cl. 250-573.000.
Schneider, Laszlo . Phototechnical apparatus of vertical arrangement for continuous development of photographic materials, particularly photographic plates. 4,710,009, Cl. 354-322.000.
Schneider, Lutz T.: *See*—
Henne, Heinrich; Patzelt, Norbert; Schneider, Lutz T.; Knobloch, Osbert; and Muller, Manfred, 4,709,864, Cl. 241-167.000.
Schneider, Thomas C., to Velten & Pulver, Inc. Article unstacking system. 4,710,089, Cl. 414-118.000.
Schnell, Josef. Exercising apparatus. 4,709,920, Cl. 272-117.000.
Schollhamer, George K.: *See*—
Layre, John; Park, Yong S.; and Schollhamer, George K., 4,709,625, Cl. 99-289.00R.
Schottli, Theodore: *See*—
Dromigny, Pierre; and Schottli, Theodore, 4,710,116, Cl. 425-125.000.
Schramm, Matthias: *See*—
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, 4,710,501, Cl. 514-256.000.
Schroder, Johann; Gawron, Klaus; Bertram, Leo; and Schemmann, Hugo, to U.S. Philips Corporation. Cooling arrangement for heat generating electrical components. 4,709,752, Cl. 165-47.000.
Schuldt, Oswald: *See*—
Conrad, Ulrich; Kellermann, Guenter; Breymayer, Angela; Klinker, Rolf; Schuldt, Oswald; Hoffmann, Rainer; and Fabian, Frank-Dietrich, 4,709,548, Cl. 60-280.000.
Schultz, Ludwig, to Siemens Aktiengesellschaft. Method for the preparation of a metallic body from an amorphous alloy. 4,710,236, Cl. 148-11.50P.
Schulz, Donald N.: *See*—
Bock, Jan; Pace, Salvatore J.; and Schulz, Donald N., 4,709,759, Cl. 166-275.000.
Schulze, Werner; and Gerich, Josef, to Alfred Karcher GmbH & Co. High pressure washing apparatus. 4,709,859, Cl. 239-525.000.
Schumacher, Robert W.; and Houston, Mary B., to Warner-Lambert Company. Ingestible, high density, compressed-tablet fruit fiber composition. 4,710,390, Cl. 426-285.000.
Schutz, Hans U.: *See*—
Beffa, Fabio; and Schutz, Hans U., 4,710,198, Cl. 8-437.000.
Schutz, Heinz-Dieter: *See*—
Langen, Hans; Schutz, Heinz-Dieter; Himmelmann, Wolfgang; Wernicke, Ubbo; and Renner, Gunter, 4,710,454, Cl. 430-546.000.
Schwab, Egon; and Padar, Steve. Non-return valve for medical purposes in particular for balloon catheters. 4,710,168, Cl. 604-99.000.
Schwandt, Gregory J.: *See*—
Baity, Donald N.; Schwandt, Gregory J.; and Kidwell, Charles E., 4,710,602, Cl. 200-315.000.
Schwartz, Jack W.: *See*—
Kwiatek, Alfred; and Schwartz, Jack W., 4,710,191, Cl. 604-897.000.
Schweier, Guenther: *See*—
Bachl, Robert; Warzelhan, Volker; Schweier, Guenther; Gropper, Hans; and Ball, Wolfgang, 4,710,552, Cl. 526-116.000.
Sciacero, James R.; and Pardee, Douglas L., to Sanders Associates, Inc. Method and apparatus for displaying multiple images in overlapping windows. 4,710,767, Cl. 340-799.000.
Scoggin, Steven C.: *See*—
Quante, Jeffrey B., III; Scoggin, Steven C.; Maxwell, Dennis L.; Rosenkoetter, Marvin W.; and Ferencik, James J., 4,709,659, Cl. 109-21.500.
Scolten, Brian L.: *See*—
Knoblock, Glenn A.; and Scolten, Brian L., 4,709,894, Cl. 248-406.200.
Scortech Mech. Ltd.: *See*—
Newman, Geoffrey C. S.; Pilkington, Andrew L.; and Winch, Kenneth H., 4,710,129, Cl. 434-55.000.
Scott & Fetzer Company, The: *See*—
Bigley, James E., 4,709,443, Cl. 15-339.000.
Scott, Graham A.; and Messerli, Alan J., to General Electric Company. Electronic circuit breaker trip function adjusting circuit. 4,710,844, Cl. 361-96.000.
Scott, Paul H., to Advanced Micro Devices, Inc. Apparatus and associated methods for converting serial data pattern signals transmitted or suitable for transmission over a high speed synchronous serial transmission media, to parallel pattern output signals. 4,710,922, Cl. 370-112.000.
Scruggs, David M., to Dresser Industries, Inc. Process for preparation of liquid phase bonded amorphous materials. 4,710,235, Cl. 148-4.000.
Seaborne, Jonathan; and Egberg, David C., to General Mills, Inc. Edible coating composition and method of preparation. 4,710,228, Cl. 106-218.000.
Seah, Alexander M. Corrugated packing and methods of use. 4,710,326, Cl. 261-112.000.
Sears Manufacturing Co.: *See*—
Wahls, Robert; and Gryp, Dennis, 4,709,896, Cl. 248-550.000.
Seasholtz, Craig A.: *See*—
Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., 4,709,436, Cl. 15-79.00R.
Seco Tools AB: *See*—
Loqvist, Kaj-Ragnar, 4,710,069, Cl. 407-114.000.
Secoh Geiken Inc.: *See*—
Bahn, Itsuki; and Okada, Hideo, 4,710,683, Cl. 318-254.000.
Segebrecht, Udo; and Auschrat, Siegfried, to Sihi GmbH & Co. KG. Liquid-ring compressor unit. 4,710,105, Cl. 417-68.000.
Seidel, Wolfgang: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.
Seigneurin, Michel: *See*—
Henri, Leonard; and Seigneurin, Michel, 4,710,178, Cl. 604-209.000.
Seiko Epson Corporation: *See*—
Hayashi, Seiichi; Nakamura, Takashi; and Tanabe, Hisayuki, 4,710,782, Cl. 346-76.00R.
Seiko Epson Kabushiki Kaisha: *See*—
Hoshikawa, Jun, 4,709,991, Cl. 350-339.00R.
Seiko Instruments & Electronics Ltd.: *See*—
Taguchi, Masaaki; and Suenaga, Hitoshi, 4,710,585, Cl. 560-64.000.
Seikosha Co., Ltd.: *See*—
Sugita, Mitsuyuki; and Hoshino, Isamu, 4,710,731, Cl. 331-158.000.
Sekiguchi, Kyoji: *See*—
Masuda, Takashi; Nakamura, Yukitugu; and Sekiguchi, Kyoji, 4,710,003, Cl. 351-212.000.
Sekiguchi, Yukio; Funakubo, Hiroyasu; Sakanoue, Hitoyuki; and Komura, Osamu, to Life Technology Research Found.; and Hiroyasu Funakubo & Sumitomo Elec. Ind., Ltd. Pressure welding bonding apparatus. 4,709,844, Cl. 228-3.100.
Sekijima, Kenji: *See*—
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.
Sekine, Shinichi: *See*—
Shirato, Takehide; and Sekine, Shinichi, 4,710,791, Cl. 357-23.130.
Selame, Robert: *See*—
Lerner, Michael; Bernstein, Michael; and Selame, Robert, 4,709,429, Cl. 4-661.000.
Selby, John S., to Weyerhaeuser Company. Choker hook assembly. 4,709,952, Cl. 294-82.140.
Sellegaard, Eric L. Preparation and process for the preservation of plants. 4,710,394, Cl. 427-4.000.
Semenov, Vladimir: *See*—
Gohler, Peter; Mangler, Rolf; Schingnitz, Manfred; Seidel, Wolfgang; Berger, Friedrich; Gudymov, Ernest; Semenov, Vladimir; Fedotov, Vasilij; and Gamburg, David, 4,710,202, Cl. 48-73.000.
Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei, 4,710,397, Cl. 427-53.100.
Sengewald, Karl-Heinz. Bag for infusion solutions and the like and method of manufacturing the same. 4,709,534, Cl. 53-452.000.
Senstar Security Systems Corporation: *See*—
Rich, Brian G.; Patchell, John W.; and Harman, R. Keith, 4,710,753, Cl. 340-561.000.
Sequoia-Turner Corporation: *See*—
von Behrens, Wieland E., 4,710,021, Cl. 356-72.000.
Sereg: *See*—
De Paepe, Thijlbert; and Crochet, Gerard, 4,709,583, Cl. 73-861.170.
Serizawa, Hiroyuki: *See*—
Shibata, Jun; and Serizawa, Hiroyuki, 4,710,936, Cl. 372-45.000.

Setterberg, John R., Jr., to Otis Engineering Corporation. Well conduit joint sealing system. 4,709,761, Cl. 166-387.000.

Setzer, David T.: *See*—
Lindstrom, Donald E.; and Setzer, David T., 4,710,068, Cl. 406-88.000.

Seura, Yasuyuki, to Ikeda Bussan Co., Ltd. Vehicle rear seat. 4,709,964, Cl. 297-354.000.

Seydel, Scott O.; and Cutts, William H. Textile slasher lubricating method and apparatus. 4,710,396, Cl. 427-8.000.

Shaka, Athan J., to Varian Associates, Inc. Spatially selective nuclear magnetic resonance pulse sequences. 4,710,718, Cl. 324-309.000.

Shaktman, Donald H. Dual crowned hemorrhoid support seat cushion. 4,709,431, Cl. 5-481.000.

Sharkitt, Patrick T.: *See*—
Stouffer, Ronald D.; and Sharkitt, Patrick T., 4,709,622, Cl. 98-2.000.

Sharma, Shanmuk; Hill, Donnie K.; and Durr, Charles A., to M. W. Kellogg Company, The. Process for separation of hydrocarbon gases. 4,710,214, Cl. 62-28.000.

Sharp Kabushiki Kaisha: *See*—
Miyaji, Takashi, 4,710,018, Cl. 355-8.000.
Nakatani, Hiroshi; Yoshida, Hirokazu; and Yamamura, Keiji, 4,710,680, Cl. 315-169.400.
Shimada, Mitsuhiro; Matsumoto, Junichiro; Nonaka, Susumu; and Sayama, Haruo, 4,710,041, Cl. 400-120.000.
Takeda, Makoto; Nonomura, Keisaku; and Yamamoto, Kunihiko, 4,710,768, Cl. 340-805.000.

Shaw, Franklin D.: *See*—
Cooley, Edward J.; and Shaw, Franklin D., 4,709,452, Cl. 19-159.00R.

Shaw, Wilfrid G.: *See*—
Dolhyj, Serge R.; Shaw, Wilfrid G.; and Pepera, Marc A., 4,710,484, Cl. 502-208.000.

Shea, Brian T.: *See*—
Hembree, Charles B.; and Shea, Brian T., 4,709,483, Cl. 33-18.100.

Shell Oil Company: *See*—
Job, Robert C., 4,710,482, Cl. 502-127.000.

Shepler, John E.; and Zur, Dov, to Sundstrand Corporation. Generating system with fault detection. 4,710,840, Cl. 361-20.000.

Sheppard, Howard H. Clamping apparatus for making an improved electrical connection. 4,710,080, Cl. 411-82.000.

Sherwin, Gary W., to Westinghouse Electric Corp. Electroencephalographic cap. 4,709,702, Cl. 128-644.000.

Shewey, Charles E.: *See*—
Knowles, Terence J.; Ray, Francis M.; and Shewey, Charles E., 4,710,707, Cl. 324-158.00F.

Shiba, Haruo: *See*—
Iizuka, Michio; and Shiba, Haruo, 4,710,839, Cl. 360-133.000.

Shibata, Jun; and Serizawa, Hiroyuki, to Matsushita Electric Industrial Co., Ltd. Optoelectronic semiconductor device. 4,710,936, Cl. 372-45.000.

Shibata, Nobuho: *See*—
Neki, Shigeo; Ohara, Kenichi; Shibata, Nobuho; and Dohi, Takashi, 4,710,688, Cl. 318-603.000.

Shichida, Akihito, to Hosiden Electronics Co. Ltd. Electrical jack assembly. 4,710,139, Cl. 439-668.000.

Shields, Charles E. Disappearing shelf assembly for use in an electrical connector applying machine. 4,709,473, Cl. 29-749.000.

Shields, William K. M.: *See*—
Kohn, Roger; and Shields, William K. M., 4,709,695, Cl. 128-132.00R.

Shigenaga, Yoshimi, to Casio Computer Co., Ltd. Identification system. 4,710,613, Cl. 235-380.000.

Shigesou, Hashida: *See*—
Nobuo, Kawahigashi; Shigesou, Hashida; and Yasunobu, Kojima, 4,710,331, Cl. 264-41.000.

Shiino, Satoru: *See*—
Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, 4,710,161, Cl. 494-84.000.

Shimada, Hiroshi: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Shimada, Katsuyuki, to Kinki Insatsu Kabushiki Kaisha. Device for opening seal of cigaret package and pulling out cigarets from the package. 4,709,811, Cl. 206-254.000.

Shimada, Mitsuhiro; Matsumoto, Junichiro; Nonaka, Susumu; and Sayama, Haruo, to Sharp Kabushiki Kaisha. Heat-transfer thermal recording device. 4,710,041, Cl. 400-120.000.

Shimada, Satoshi: *See*—
Ohkoshi, Akio; Tsuruta, Koji; Nakagawa, Hideaki; and Shimada, Satoshi, 4,710,765, Cl. 340-781.000.

Shimadzu Corporation: *See*—
Fukuma, Toshiaki, 4,710,024, Cl. 356-328.000.

Shimaoka, Motohiro; and Saito, Yukio, to Alps Electric Co., Ltd. Disk loading mechanism for recording and reproducing apparatus. 4,710,829, Cl. 360-97.000.

Shimeno, Kazuhiro: *See*—
Shirasu, Hiroshi; Shimeno, Kazuhiro; and Iwamoto, Joji, 4,710,604, Cl. 219-121.0LU.

Shimizu Construction Co., Ltd.: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Shimizu, Hiroshi: *See*—
Yamaguchi, Youko; Shimizu, Hiroshi; Tsuda, Ichiro; Yano, Masafumi; and Okumura, Tokiko, 4,710,964, Cl. 382-17.000.

Shimizu, Keiichi; Kikuchi, Sanae; and Nakano, Hitoshi, to Honda Giken Kogyo Kabushiki Kaisha. Seal for dampers on motor vehicles. 4,709,931, Cl. 277-153.000.

Shimizu, Masami: *See*—
Tosaka, Yoichi; and Shimizu, Masami, 4,710,008, Cl. 354-289.100.

Shimizu, Mitsuru: *See*—
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, 4,710,913, Cl. 369-280.000.

Shimizu, Tadashi: *See*—
Ohshima, Ken; and Shimizu, Tadashi, 4,710,908, Cl. 369-32.000.

Shimoda, Kaneyasu; Katoh, Tadayoshi; and Ageno, Yuzo, to Fujitsu Limited. Sequential decoding device for decoding systematic code. 4,710,746, Cl. 340-347.0DD.

Shimohara, Jun: *See*—
Suzuki, Mitsutoshi; Morita, Yoshitaka; Okada, Masami; and Shimohara, Jun, 4,710,297, Cl. 210-493.200.

Shimohashi, Hirotaka: *See*—
Kawai, Yasuo; and Shimohashi, Hirotaka, 4,710,379, Cl. 424-93.000.

Shimotakahara, Masaki: *See*—
Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, 4,710,161, Cl. 494-84.000.

Shimoyama, Yujiro: *See*—
Sasaki, Shinji; Shimoyama, Yujiro; and Watanabe, Yoshinori, 4,710,600, Cl. 200-291.000.

Shinozaki, Fumihiko; and Yokoyama, Yutaka, to Nippon Chemi-Con Corp. Electrolyte for electrolytic capacitor. 4,710,310, Cl. 252-62.200.

Shiokawa, Kozo: *See*—
Kurahashi, Yoshio; Shiokawa, Kozo; Kagabu, Shinzo; Sakawa, Shinji; and Moriya, Koichi, 4,710,518, Cl. 514-624.000.

Shirasu, Hiroshi; Shimeno, Kazuhiro; and Iwamoto, Joji, to Nippon Kogaku K. K. Machining apparatus with laser beam. 4,710,604, Cl. 219-121.0LU.

Shirato, Takehide; and Sekine, Shinichi, to Fujitsu Limited. Protection device in an integrated circuit. 4,710,791, Cl. 357-23.130.

Shitaoka, Shizuo: *See*—
Tokumoto, Minoru; Takagi, Motoyuki; Shitaoka, Shizuo; Gold, Samuel; and Iovine, Carmine P., 4,710,526, Cl. 524-5.000.

Shiung, Huang J.: *See*—
DeLuca, Charles Q.; and Shiung, Huang J., 4,710,090, Cl. 414-550.000.

Shoji, Masakazu, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Dual domino CMOS logic circuit, including complementary vectorization and integration. 4,710,650, Cl. 307-452.000.

Shop-Vac Corporation: *See*—
Berfield, Robert C.; Seasholtz, Craig A.; and Fegan, Richard M., 4,709,436, Cl. 15-79.00R.

Shugarman, Arnold L.: *See*—
Wong, Morton M.; and Shugarman, Arnold L., 4,710,367, Cl. 423-335.000.

Shurtleff, Jill M.; and Lee, Alejandro C., to Gillette Company, The. Safety razor system. 4,709,476, Cl. 30-41.000.

Siadat, Bahram; and Morgan, Charles R., to W. R. Grace & Co. Heat activatable adhesive or sealant compositions. 4,710,539, Cl. 525-59.000.

Sidaway, H. John; and Lytle, Donald A., to Hancor, Inc. Septic tank for alternative sewer systems. 4,709,723, Cl. 137-584.000.

Siemens Aktiengesellschaft: *See*—
Auracher, Franz, 4,709,977, Cl. 350-96.140.
Brand, Wilhelm; Vanek, Vaclav; and Jakobec, Franz, 4,710,834, Cl. 360-105.000.
Buttner, Gerhard, 4,710,961, Cl. 381-68.700.
Dotzauer, Peter; and Schmidt, Martin, 4,709,559, Cl. 62-499.000.
Glomb, Kurt; Niggl, Heinz; Pelzl, Leo; and Zell, Karl, 4,710,132, Cl. 439-79.000.
Hohmann, Eugen; Mund, Konrad; and Weidlich, Erhard, 4,710,233, Cl. 134-1.000.
Jahn, Herbert; and Waedt, Gunter, 4,710,850, Cl. 361-333.000.
Jahnke, Andreas, 4,710,722, Cl. 328-234.000.
Jahnke, Andreas, 4,710,838, Cl. 360-125.000.
Klein, Sigismund, 4,710,947, Cl. 378-147.000.
Koller, Franz, 4,709,847, Cl. 228-49.100.
Lampl, Josef, 4,710,953, Cl. 379-391.000.
Meier, Konrad, 4,709,470, Cl. 29-605.000.
Oestreich, Ulrich; and Mayr, Ernst, 4,709,984, Cl. 350-96.230.
Schultz, Ludwig, 4,710,236, Cl. 148-11.50P.

Sigai, A. Gary, to GTE Laboratories Incorporated. Phosphor particle, fluorescent lamp, and manufacturing method. 4,710,674, Cl. 313-489.000.

Sigma-Tau Industrie Pharmaceutiche Riunite S.p.A.: *See*—
Sih, Charles J., 4,710,468, Cl. 435-135.000.

Sigman, Daniel M., Jr.: *See*—
Davey, Raymond G.; Dees, Martin, Jr.; and Sigman, Daniel M., Jr., 4,709,631, Cl. 101-129.000.

Sih, Charles J., to Sigma-Tau Industrie Pharmaceutiche Riunite S.p.A. Process for preparing L-carnitine and chemical intermediates employed therein. 4,710,468, Cl. 435-135.000.

Sihi GmbH & Co. KG: *See*—
Segebrecht, Udo; and Auschrat, Siegfried, 4,710,105, Cl. 417-68.000.
SILCA S.p.A.: *See*—
Camillo, Bianchi, 4,709,511, Cl. 51-216.00R.
Siller, Curtis A., Jr.: *See*—
Debus, Walter, Jr.; Osborne, Thomas L.; and Siller, Curtis A., Jr., 4,710,891, Cl. 364-718.000.
Simcox, Allan W., to Environmental Resources, Inc. Solar heat exchange system. 4,709,689, Cl. 126-448.000.
Simons, Robert E.: *See*—
Chu, Richard C.; and Simons, Robert E., 4,709,754, Cl. 165-133.000.
Singh, Balwant: *See*—
Forgione, Peter S.; and Singh, Balwant, 4,710,542, Cl. 525-127.000.
Singh, Bawa; and Denton, Peter R., to Denton Vacuum Inc. Cold cathode ion beam source. 4,710,283, Cl. 204-298.000.
Sinn, Robert S.: *See*—
Catsimpoolas, Nicholas; McCluer, Robert; Sinn, Robert S.; and Evans, James, 4,710,490, Cl. 514-25.000.
Siol, Werner: *See*—
Kraemer, Dieter; Siol, Werner; Markert, Gerhard; Suetterlin, Norbert; and Feil, Cornelia, 4,710,525, Cl. 523-201.000.
Sipes, Donald L., Jr., to California Institute of Technology. Method and apparatus for efficient operation of optically pumped laser. 4,710,940, Cl. 372-75.000.
Sipinen, Alan J.: *See*—
Wood, Leigh E.; Miller, John A.; and Sipinen, Alan J., 4,710,190, Cl. 604-389.000.
Sirota, Gabriel J., to Amco Industries, Inc. Roll handling apparatus. 4,709,953, Cl. 294-106.000.
Sitma Societa Italiana Macchine Automatiche S.p.A.: *See*—
Ballestrazzi, Aris; and Tassi, Lamberto, 4,709,530, Cl. 53-209.000.
Ballestrazzi, Aris; and Tassi, Lamberto, 4,709,537, Cl. 53-550.000.
Siwik, William S.: *See*—
Stevens, Leonard W.; Siwik, William S.; Moore, William A.; Brown, Wayne M.; and Barnard, Andrew A., 4,709,545, Cl. 60-39.080.
SKF GmbH: *See*—
Huttner, Klaus, 4,710,039, Cl. 384-574.000.
SKF Steel Engineering AB: *See*—
Santen, Sven; Eriksson, Sven; and Bernhard, Ragnar, 4,710,269, Cl. 162-30.100.
Skinner, Wilfred A.: *See*—
Heller, Jorge; Skinner, Wilfred A.; Saito, Kenichiro; and Satoh, Susumu, 4,710,497, Cl. 514-221.000.
Skoog, Hans; Holmqvist, Ulf; and Tellden, Leif, to ASEA AB. Industrial robot having two gimbal-ring type arranged swinging axes. 4,710,092, Cl. 414-729.000.
Skursha, Susan K.: *See*—
Malone, Gilbert R.; Skursha, Susan K.; and Jost, Robert M., 4,710,474, Cl. 436-60.000.
Slabbekoorn, Scott D.: *See*—
Anselmino, Jeffrey; and Slabbekoorn, Scott D., 4,709,488, Cl. 34-235.000.
Slade, James R., Jr.; and Sterba, Richard F. Barbell support apparatus for weight lifting exercising. 4,709,922, Cl. 272-123.000.
Slater, Daniel A.; Meredith, William A.; and Devaney, Mark J., to Eastman Kodak Company. Simplified test element advancing mechanism having positive engagement with element. 4,710,352, Cl. 422-63.000.
Slater, Eve E.: *See*—
Liang, Theming; and Slater, Eve E., 4,710,469, Cl. 435-194.000.
Sletten, William C., II, to Advance Machine Company. Portable extractor. 4,709,442, Cl. 15-320.000.
Slicker, Steven D.: *See*—
Uecker, Ronald T.; and Slicker, Steven D., 4,709,963, Cl. 297-316.000.
Sloan-Kettering Institute for Cancer Research: *See*—
Dupont, Bo; Morishima, Yasuo; Collins, Nancy; Ogata, Shunichiro; and Lloyd, Kenneth O., 4,710,457, Cl. 435-7.000.
Slosberg, David K.; and Nowell, Gilbert S., to Compo Industries, Inc. Reinforced foam anti-fatigue floor tile module and method of making same. 4,710,415, Cl. 428-48.000.
Sluss, Elmer C.; Nettleton, John E.; and Barr, Dallas N., to United States of America, Army. Perforated electrodes for efficient gas transfer in CW CO_2 waveguide lasers. 4,710,941, Cl. 372-87.000.
Sluyterman, Albertus A. S., to U.S. Philips Corporation. Color television display tube with coma correction. 4,710,671, Cl. 313-413.000.
Small, William M.: *See*—
Gentry, Cecil C.; and Small, William M., 4,709,755, Cl. 165-160.000.
Smart, Leonard G.; and Hui, Henry T., to CF Braun & Company. High temperature pipe and duct support. 4,709,886, Cl. 248-49.000.
Smedley, William H.: *See*—
Haber, Terry M.; Smedley, William H.; and Foster, Clark B., 4,710,170, Cl. 604-110.000.
Smith, D. Frederick; and Goodsmith, James E., to T. M. Smith Tool International Corp. Quick change spindle adapter for tool holder. 4,710,079, Cl. 409-234.000.
Smith, David E.; Olmsted, Dennis R.; and Fryberger, Joseph A., to Aspen Peripherals. Device for positioning a tape threader pin in a take-up reel. 4,709,873, Cl. 242-195.000.
Smith, David W.: *See*—
Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 4,709,447, Cl. 17-1.00F.
Smith, Dennis W.: *See*—
Borrelli, Nicholas F.; Hares, George B.; Smith, Dennis W.; and Wedding, Brent M., 4,710,430, Cl. 428-432.000.
Smith International, Inc.: *See*—
Geczy, Bela, 4,710,036, Cl. 384-275.000.
Springer, Johann B., 4,710,074, Cl. 408-200.000.
Smith, Kirby A.: *See*—
Kuppenheimer, John D., Jr.; and Smith, Kirby A., 4,710,630, Cl. 250-353.000.
Smith, Paul R.: *See*—
Samuels, Gerard; and Smith, Paul R., 4,709,632, Cl. 101-163.000.
Smith, Robert R.; and Briggs, Thomas B. Subcutaneous ventricular injection apparatus and method. 4,710,177, Cl. 604-185.000.
Smith, Stanley R. Indicator for loose lug nuts. 4,709,654, Cl. 116-283.000.
Smithson, Alan: *See*—
Bateman, John R.; Goodacre, Brita C.; and Smithson, Alan, 4,710,231, Cl. 127-30.000.
Smolyanitsky, Boris N.: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.
Snamprogetti, S.p.A.: *See*—
Gazzi, Luigi; and Rescalli, Carlo, 4,710,210, Cl. 62-17.000.
Gazzi, Luigi; and Rescalli, Carlo, 4,710,211, Cl. 62-17.000.
Sneyd, James C., Jr.; Harris, Robert D.; and Latimer, Margaret G., to Kimberly-Clark Corporation. Foraminous net cover for absorbent articles. 4,710,185, Cl. 604-372.000.
Sobocienski, James Robert: *See*—
Lipinski, Henry, 4,709,782, Cl. 182-3.000.
Sobocienski, Lorraine: *See*—
Lipinski, Henry, 4,709,782, Cl. 182-3.000.
Societe Anonyme D.B.A.: *See*—
Sauvee, Jean P.; Riquart, Christian; and Levrai, Roland, 4,709,550, Cl. 60-562.000.
S.A. Innovi N.V.: *See*—
Geuens, Luc, 4,710,301, Cl. 210-605.000.
Societe de Recherches Industrielles (S.O.R.I.): *See*—
Robin, Jacques; Pruneau, Didier; and Bonenfant, Alain, 4,710,505, Cl. 514-278.000.
Societe Europeenne de Propulsion: *See*—
Broquere, Bernard; and Etienne, Jacques, 4,709,457, Cl. 29-156.80R.
Societe Francaise d'Equipements pour la Navigation Aerienne: *See*—
Dubois, Marcel; and Fagard, Pierre, 4,710,766, Cl. 340-784.000.
Societe Nationale des Poudres et Explosifs: *See*—
Lebas, Jean-Marie; Rat, Pierre; Dupont, Jean-Marcel; and Vinuesa, Germain, 4,710,329, Cl. 264-3.100.
Societe Nationale Industrielle et Aerospatiale: *See*—
Darrieux, Jean-Louis, 4,710,412, Cl. 428-36.000.
Socolowski, Norbert J., to Fry Metals, Inc. Solder preform and methods employing the same. 4,709,849, Cl. 228-246.000.
Soeda, Kazuhiko; Mori, Masakazu; Nishikawa, Tsutomu; and Tomimori, Kiyoshi, to Fujitsu Limited. Method and apparatus for measuring chromatic dispersion coefficient. 4,710,022, Cl. 356-73.100.
Soeder, Edmund J.: *See*—
Ward, Thomas H.; Costanzo, Phillip A.; Pietrasz, Vincent; and Soeder, Edmund J., 4,710,344, Cl. 419-8.000.
Solek, Roman: *See*—
McCutcheon, Samuel; Lum, Jeffrey; Solek, Roman; Harrell, Troy; and Leman, Robert, 4,710,893, Cl. 364-900.000.
Somich Technology Inc.: *See*—
Soszek, Peter, 4,710,253, Cl. 156-272.800.
Songer, Jimmie D., to High Resolution Television, Inc. High resolution color television. 4,710,799, Cl. 358-12.000.
Sonobe, Akihiko: *See*—
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.
Sony Corporation: *See*—
Hayashi, Toshihide; Yamakami, Osamu; and Kanayama, Ikuo, 4,710,972, Cl. 455-179.000.
Ishidoh, Takanobu; and Kondoh, Yoshiyuki, 4,710,921, Cl. 370-110.100.
Kondo, Tetsujiro, 4,710,811, Cl. 358-135.000.
Ohkoshi, Akio; Tsuruta, Koji; Nakagawa, Hideaki; and Shimada, Satoshi, 4,710,765, Cl. 340-781.000.
Sato, Noboru; Habu, Kazutaka; and Abe, Sanae, 4,710,434, Cl. 428-678.000.
Yamamoto, Tadashi, 4,710,950, Cl. 379-70.000.
Soroka, Daniel P.; Swensrud, Roger L.; and Zelezniak, Joseph J., to Westinghouse Electric Corp. Two-axis optic wrist for laser applications. 4,710,606, Cl. 219-121.0LU.
Soszek, Peter, to Somich Technology Inc. Method for manufacturing a circuit board. 4,710,253, Cl. 156-272.800.
Soukup, Thomas G.; and Oliver, John P., to Celotex Corporation, The. Catalyst mixtures for polyisocyanurate foam. 4,710,521, Cl. 521-118.000.
Soupal, Thomas R., to Midland Brake, Inc. Isolation valve construction. 4,710,108, Cl. 417-298.000.
South, Alan C., to R. W. Simon Limited. Bottle carrier. 4,709,809, Cl. 206-162.000.
Southern Pacific Land Co.: *See*—
Wong, Morton M.; and Shugarman, Arnold L., 4,710,367, Cl. 423-335.000.

Southwest Research Institute: *See*—
Mallow, William A., 4,710,226, Cl. 106-119.000.
Spadel S.A.: *See*—
Lahaye, Marcel, 4,710,409, Cl. 427-421.000.
Spak, Michael E.: *See*—
Zolnowsky, John; Crudele, Lester M.; and Spak, Michael E., 4,710,866, Cl. 364-200.000.
Spector, George: *See*—
Lemons, David H.; and Spector, George, 4,709,691, Cl. 128-66.000.
Spectra-Physics, Inc.: *See*—
Howard, P. Guy, 4,710,942, Cl. 372-87.000.
Spectrolab, Inc.: *See*—
Garlick, George F. J., 4,710,254, Cl. 156-278.000.
Speil, Walter: *See*—
Klug, Horst; Mocker, Wolfgang; Schaeffler, George; and Speil, Walter, 4,709,668, Cl. 123-90.550.
Spencer, Michael S.: *See*—
Jenkins, Stuart M.; Spencer, Michael S.; and Mayfield, Ross, 4,709,820, Cl. 209-534.000.
Spencer, William R.: *See*—
Freberg, Dana D.; and Spencer, William R., 4,710,095, Cl. 415-48.000.
Speroni, Richard J. Indexing mechanism for computer controlled milling machines. 4,709,464, Cl. 29-568.000.
Spinosa, Dominic J.; and Knoll, Frank, to East/West Industries, Inc. Apparatus and method for compression packaging a compressible article into a container and a container therefor. 4,709,818, Cl. 206-524.800.
Spitznas, Manfred; Reiner, Josef; Veit, Wolfgang; and Kirchhuebel, Rainer, to Oculus Optikgeraete GmbH. Surgical stereomicroscope. 4,710,000, Cl. 350-516.000.
Spodati, Fabrizio; and Tamburello, Mario, to Telettra-Telefonia Elettronica e Radio S.p.A. System for the connection of photodetectors to optical fibers. 4,709,979, Cl. 350-96.200.
Spranger, Dieter: *See*—
Lewandowski, Dieter; Ostermoor, Rolf; and Spranger, Dieter, 4,710,330, Cl. 264-25.000.
Springer, Helmut: *See*—
Bahrmann, Helmut; Cornils, Boy; Lipps, Wolfgang; Lappe, Peter; and Springer, Helmut, 4,710,321, Cl. 200-501.150.
Springer, Johann B., to Smith International, Inc. Casing mill. 4,710,074, Cl. 408-200.000.
Square D Company: *See*—
Libert, James T.; and Curran, Earl J., Jr., 4,710,692, Cl. 318-729.000.
Stabilus GmbH: *See*—
Freitag, Herbert; Fuhrmann, Castor; and Hosan, Hans-Josef, 4,709,790, Cl. 188-300.000.
Stacik, Harold S.; and Hafstrom, Warren R., to Whirlpool Corporation. Open lid latching mechanism for automatic washer. 4,709,951, Cl. 292-189.000.
Stadler, Peter: *See*—
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, 4,710,491, Cl. 514-42.000.
Stafford, Frank K.; and Nasby, Robert C. Movable roof support and bolter system. 4,710,064, Cl. 405-290.000.
Stafford, Lannon F. Controlled air-flow aircraft capable of vertical flight. 4,709,879, Cl. 244-12.100.
Stahl, Torvald, to ITT Industries, Inc. Connection socket for a submersible electric motor. 4,710,658, Cl. 310-71.000.
Stahly, Barbara C.: *See*—
Stahly, G. Patrick; and Stahly, Barbara C., 4,710,581, Cl. 560-20.000.
Stahly, G. Patrick; and Stahly, Barbara C., to Ethyl Corporation. Nucleophilic substitution process. 4,710,581, Cl. 560-20.000.
Stalzer, Henry: *See*—
DiGiulio, Peter C.; and Stalzer, Henry, 4,710,882, Cl. 364-464.000.
Stanadyne, Inc.: *See*—
Djordjevic, Ilija; and Ganser, Marco, 4,709,679, Cl. 123-447.000.
Standard Oil Company, The: *See*—
Cesa, Mark C.; and Burrington, James D., 4,710,574, Cl. 548-533.000.
Dolhyj, Serge R.; Shaw, Wilfrid G.; and Pepera, Marc A., 4,710,484, Cl. 502-208.000.
Standex International Corporation: *See*—
Black, John W., 4,709,444, Cl. 16-31.00A.
Stanley, Roderic K.: *See*—
Bradfield, James E.; Kahil, John E.; Jaynes, Mark S.; Moake, Gordon L.; Milewits, Marvin; Bolton, Curtis W., III; Lam, Clive C.; and Stanley, Roderic K., 4,710,712, Cl. 324-227.000.
Stanley, Thomas R.; and Zeleznik, Mark R., to Teepak, Inc. Apparatus and methods of stuffing food casings to provide dimensionally uniform products. 4,709,450, Cl. 17-49.000.
Staszko, Wladyslaw, to ACME P.W. Lenzen GbmH & Co. KG. Locking sleeve magazine feed attachment for a device for sealing steel wrapping bands. 4,709,627, Cl. 100-30.000.
Statomat-Globe, Inc.: *See*—
Beakes, John M.; and Finegold, Hyman B., 4,710,085, Cl. 414-27.000.
Stauffer, Richard D., to Amoco Corporation. Process for preparing overbased sulfurized phenates. 4,710,308, Cl. 252-42.700.
Steelcase Inc.: *See*—
Knoblock, Glenn A.; and Scolten, Brian L., 4,709,894, Cl. 248-406.200.
Steeltin Can Corporation: *See*—
Kadunce, Leo, 4,710,252, Cl. 156-195.000.
Steer, Peter L., to Craig Medical Products Ltd. Ostomy appliance. 4,710,183, Cl. 604-344.000.
Stefko, Bela: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.
Steiner, Werner: *See*—
Bandara, Upali; Hinkel, Holger; Steiner, Werner; and Trippel, Gerhard, 4,710,424, Cl. 428-325.000.
Steinmann, Joachim, to Kloeber GmbH & Co. Work chair with a tilting mechanism for seat squab and backrest. 4,709,962, Cl. 297-301.000.
Stemler, J. Robert; Klingensmith, James D.; Menzemer, Craig C.; Kulicki, John M.; and Theofanis, Nicholas D., to Aluminum Company of America. Bridge deck system. 4,709,435, Cl. 14-73.000.
Stemmler, Kurt, to Winkler & Dunnebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG. Plant for producing stacks of intermeshed blanks of paper, cellulose or the like, folded in a zig-zag manner. 4,709,606, Cl. 83-94.000.
Stephen, John F.: *See*—
Nelson, Richard V.; and Stephen, John F., 4,710,527, Cl. 524-98.000.
Stephens, Robert K., to Polaroid Corporation, Patent Dept. Solar radiation-control articles with protective overlayer. 4,710,426, Cl. 428-336.000.
Stephenson, Kenneth E., to Sangamo Weston, Inc. Solid dynode structure for photomultiplier. 4,710,675, Cl. 313-532.000.
Stephenson, Stanley W., to Eastman Kodak Company. Thermal printer color dye frame identification using red and yellow light sources. 4,710,781, Cl. 346-76.0PH.
Sterba, Richard F.: *See*—
Slade, James R., Jr.; and Sterba, Richard F., 4,709,922, Cl. 272-123.000.
Stern, Howard; Mauro, Alex; and Lee, Jay, to Robotic Vision System, Inc. Digital flow control system. 4,709,858, Cl. 239-296.000.
Sterns, William G., to ITT Gilfillan, a division of ITT Corporation. Microwave polarization control network. 4,710,734, Cl. 333-101.000.
Stevens, Leonard W.; Siwik, William S.; Moore, William A.; Brown, Wayne M.; and Barnard, Andrew A., to United Technologies Corporation. Bearing compartment protection system. 4,709,545, Cl. 60-39.080.
Stevens, Robert A.: *See*—
Boland, Leona G.; Stevens, Robert A.; Wilson, John C.; and Zehner, Georgia L., 4,710,187, Cl. 604-385.00A.
Stewart, Raymond. Front wheel centering mechanism for wheelchairs. 4,709,939, Cl. 280-242.0WC.
Stidwell, Alan G. Flexible waveguides with 45° corrugations to allow bending and twisting of waveguides. 4,710,736, Cl. 333-241.000.
Stinnett, Carlton E.: *See*—
Flora, John H.; Womack, Robert E.; Stinnett, Carlton E.; and Dalton, Claude W., 4,710,710, Cl. 324-220.000.
Stoll, Kurt. Prismatic connection member for the supply of valves or the like. 4,709,945, Cl. 285-4.000.
Stoll, Mark S., to Liberty Diversified Industries. Produce transport and cooling container and method for using same. 4,709,852, Cl. 229-119.000.
Stouffer, Ronald D.; and Sharkitt, Patrick T., to Bowles Fluidics Corporation. Fluidic oscillator. 4,709,622, Cl. 98-2.000.
Strein, Klaus: *See*—
Mertens, Alfred; Holck, Jens-Peter; Kampe, Wolfgang; Muller-Beckmann, Bernd; Strein, Klaus; and Schaumann, Wolfgang, 4,710,510, Cl. 514-394.000.
Strentz, Daniel, to Superba S.A. Capacitive cell for continuous measurement of the linear mass of textile products. 4,710,701, Cl. 324-61.00P.
Stress Steel Co., Inc.: *See*—
Iyer, Srinivasa L., 4,709,456, Cl. 29-155.00R.
Strikman, Shmuel, to Numar Corporation; and Taicher, Zvi. Nuclear magnetic resonance sensing apparatus and techniques. 4,710,713, Cl. 324-303.000.
Strippit/Di-Acro-Houdaille, Inc.: *See*—
Clark, Stephen C., 4,709,605, Cl. 83-23.000.
Strul, Bruno: *See*—
Alvarez, Robert; Lehmann, Leonard; and Strul, Bruno, 4,710,624, Cl. 250-228.000.
Strupczewski, Joseph T., to Hoechst Roussel Pharmaceuticals, Inc. 3-(piperidinyl)-and 3-(pyrrolidinyl)-1H-indazoles. 4,710,573, Cl. 546-199.000.
Stubenfoll, Leonard J.: *See*—
Rasmussen, Russell G.; Stubenfoll, Leonard J.; and Disko, Harry, 4,710,146, Cl. 446-308.000.
Studer, Philip A. Spring neutralized magnetic vibration isolator. 4,710,656, Cl. 310-51.000.
Subramanian, Mahadevan: *See*—
Blackwell, Catherine A.; Lakshmanan, Raman; and Subramanian, Mahadevan, 4,710,870, Cl. 364-200.000.
Suenaga, Hitoshi: *See*—
Taguchi, Masaaki; and Suenaga, Hitoshi, 4,710,585, Cl. 560-64.000.
Suetterlin, Norbert: *See*—
Kraemer, Dieter; Siol, Werner; Markert, Gerhard; Suetterlin, Norbert; and Feil, Cornelia, 4,710,525, Cl. 523-201.000.

Sugawara, Katuo: *See*—
Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, 4,710,854, Cl. 361-414.000.

Sugita, Mitsuyuki; and Hoshino, Isamu, to Seikosha Co., Ltd. Planar type thickness shear mode quartz oscillator. 4,710,731, Cl. 331-158.000.

Sugiura, Noboru: *See*—
Mouri, Yasunori; and Sugiura, Noboru, 4,710,881, Cl. 364-431.080.

Sugiyama, Toshinori: *See*—
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, 4,710,913, Cl. 369-280.000.

Sugizono, Shuichi: *See*—
Kawai, Katsunori; Kobayashi, Hisao; Deguchi, Hiroyuki; and Sugizono, Shuichi, 4,709,555, Cl. 62-228.300.

Sukeda, Toshiaki: *See*—
Maegawa, Harumi; Takai, Sakao; Sukeda, Toshiaki; Irie, Shoji; and Kobata, Shoichi, 4,710,895, Cl. 365-2.000.

Sulzer-Escher Wyss AG: *See*—
Guttinger, Heinz, 4,709,571, Cl. 72-366.000.

Sulzer, Jean F., to Enertec. Tracking alignment for a rotating magnetic transducer head. 4,710,828, Cl. 360-75.000.

Sumi, Masahiko, to Kabushiki Kaisha Toshiba. Apparatus for performing desired logical function. 4,710,898, Cl. 365-189.000.

Sumigawa, Yukio, to Sanshin Kogyo Kabushiki Kaisha. Outboard motor provided with a four-stroke engine. 4,709,671, Cl. 123-196.00S.

Sumino, Tomoko: *See*—
Wakamiya, Yoshinori; and Sumino, Tomoko, 4,709,570, Cl. 72-365.000.

Sumitomo Chemical Company, Limited: *See*—
Hattori, Makoto; Nishikuri, Masao; and Ueda, Yasuyoshi, 4,710,320, Cl. 260-378.000.
Imai, Akio; Okamoto, Yasushi; and Saito, Masatoshi, 4,710,554, Cl. 526-180.000.
Takahashi, Junya; Kato, Toshiro; and Kamoshita, Katsuzo, 4,710,514, Cl. 514-485.000.

Sumitomo Metal Industries, Ltd.: *See*—
Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, 4,710,215, Cl. 62-532.000.
Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Maehara, Yasuhiro; and Yasumoto, Kunio, 4,709,572, Cl. 72-366.000.
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Sumitomo Metal & Mining Co., Ltd.: *See*—
Yamazaki, Shinsuke; Takeda, Rikio; and Uda, Iwao, 4,710,349, Cl. 420-495.000.

Sumsky Filial Kharkovskogo Politekhnicheskogo Instituta: *See*—
Kholin, Boris G., 4,709,685, Cl. 124-7.000.

Sun, Lee C.: *See*—
Gil, Kim Y.; and Sun, Lee C., 4,710,347, Cl. 420-94.000.

Sunden, Agneta: *See*—
Sunden, Olof; and Sunden, Agneta, 4,710,270, Cl. 162-175.000.

Sunden, Olof; and Sunden, Agneta. Paper making process utilizing fillers with hardened envelopes of cationic starch. 4,710,270, Cl. 162-175.000.

Sundstrand Corporation: *See*—
Ewbank, Michael E.; and Johnson, Henry F., 4,709,665, Cl. 122-510.000.
Shepler, John E.; and Zur, Dov, 4,710,840, Cl. 361-20.000.

Superba S.A.: *See*—
Strentz, Daniel, 4,710,701, Cl. 324-61.00P.

Surgical Engineering Associates, Inc.: *See*—
Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 4,710,174, Cl. 604-175.000.

Susukida, Hiroshi: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Suter, Hans R., to Roag (AG). Method of dyeing an optical article. 4,710,199, Cl. 8-507.000.

Sutphin, Richard C.; Bell, Steven R.; and Monsell, Kurt, to Acme Electric Corporation. Microprocessor controlled battery charger. 4,710,694, Cl. 320-21.000.

Suzuki, Atsushi, to Fujitsu Limited. Constant pulse width generator including transition detectors. 4,710,904, Cl. 365-226.000.

Suzuki, Hideo; Okamoto, Kunihide; Hayashi, Yasuyuki; and Aiba, Mitsuru, to Kabushiki Kaisha Showa Seisakusho. Vehicle leveling system. 4,709,934, Cl. 280-6.00R.

Suzuki, Hideo, to Fujitsu Limited. Josephson-junction logic device. 4,710,651, Cl. 307-462.000.

Suzuki, Kenji; Terashita, Takaaki; and Murayama, Jin, to Fuji Photo Film Co., Ltd. Color filter and color image sensor using the same. 4,710,803, Cl. 358-41.000.

Suzuki, Kimio: *See*—
Hakata, Yoshitami; Wakuda, Masanori; and Suzuki, Kimio, 4,710,770, Cl. 340-870.180.

Suzuki, Masahiko: *See*—
Iwata, Hiroshi; Kuroyanagi, Masatoshi; Suzuki, Masahiko; Moriguchi, Koichi; Horiuchi, Yasuhiro; and Nakamura, Kanehito, 4,710,106, Cl. 417-213.000.

Suzuki, Masahiro: *See*—
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, 4,710,913, Cl. 369-280.000.

Suzuki, Masanori, to Mitsubishi Denki Kabushiki Kaisha. Gate turn-off thyristor. 4,710,792, Cl. 357-38.000.

Suzuki, Mitsutoshi; Morita, Yoshitaka; Okada, Masami; and Shimohara, Jun, to Kabushiki Kaisha Tsuchiya Seisakusho. Fluid filter with pleated filter medium. 4,710,297, Cl. 210-493.200.

Suzuki, Shigeru, to Akashi Seisakusho Ltd. Specimen moving device for electron microscope. 4,710,633, Cl. 250-442.100.

Suzuki, Shintaro: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,710,517, Cl. 514-616.000.

Suzuki, Takeo, to Alps Electric Co., Ltd. Varactor diode tuner with band switched coils and lines. 4,710,973, Cl. 455-180.000.

Suzuki, Takeshi, to Nippon Electric Co., Ltd. Mounting structure for electronic apparatus or the like. 4,710,136, Cl. 439-374.000.

Suzuki, Tetsushi: *See*—
Ichikawa, Noriyuki; Suzuki, Tetsushi; and Atsumi, Tomiaki, 4,710,152, Cl. 474-166.000.

Suzuki, Yasunaga; Matsubara, Toshiaki; and Uragami, Akira, to Hitachi, Ltd. Semiconductor integrated circuit device. 4,710,842, Cl. 361-88.000.

Swapp, Mavin C.; and Frisbie, Milo W., to Motorola, Inc. Input buffer and article injector mechanism for an automated article handler. 4,709,801, Cl. 198-464.200.

Swartz, Mark E.: *See*—
Mussler, James M.; and Swartz, Mark E., 4,710,758, Cl. 340-712.000.

Swensrud, Roger L.: *See*—
Soroka, Daniel P.; Swensrud, Roger L.; and Zelezniak, Joseph J., 4,710,606, Cl. 219-121.0LU.

Swiderski, Kevin J., to B & G Machinery Company. Preform transfer mechanism. 4,709,803, Cl. 198-468.200.

Switlicki, Michael. Process for heating hair curlers by microwave energy. 4,710,609, Cl. 219-222.000.

Syryamin, Jury N.: *See*—
Kostylev, Alexandr D.; Boginsky, Vladimir P.; Smolyanitsky, Boris N.; Syryamin, Jury N.; Danilov, Boris B.; Kogan, David I.; and Saveliev, Vyacheslav N., 4,709,768, Cl. 175-296.000.

Szilbereky, Jeno: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Szkaradek, Edward J.; and Corrigan, John J., to Morehouse Industries, Inc. Media mill screen assembly. 4,709,863, Cl. 241-69.000.

Szotyori, Laszlo: *See*—
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Szurkowski, Edward S.: *See*—
Kapur, Rajan N.; and Szurkowski, Edward S., 4,710,761, Cl. 340-721.000.

T. J. Cope, Inc.: *See*—
Cubit, Harry T.; and Johnson, George C., 4,709,888, Cl. 248-73.000.

T. M. Smith Tool International Corp.: *See*—
Smith, D. Frederick; and Goodsmith, James E., 4,710,079, Cl. 409-234.000.

Ta Triumph-Adler Aktiengesellschaft: *See*—
Ackermann, Rolf, 4,710,044, Cl. 400-208.000.
Moritz, Manfred; and Rettke, Wilfried, 4,710,042, Cl. 400-141.000.

Tabata, Hiroshi: *See*—
Kai, Yasuaki; Sagawa, Takatoshi; and Tabata, Hiroshi, 4,709,988, Cl. 350-276.00R.

Tabata, Nobuchika; and Fukumitsu, Shohji, to Chisso Corporation. Flame retardant polyolefin resin composition. 4,710,317, Cl. 252-609.000.

Tabur Caoutchouc: *See*—
Loheac, Charles, 4,710,597, Cl. 200-5.00A.

Tagashira, Yasuo: *See*—
Akiyama, Masashi; and Tagashira, Yasuo, 4,709,845, Cl. 228-17.000.

Taguchi, Masaaki; and Suenaga, Hitoshi, to Seiko Instruments & Electronics Ltd.; and Teikoku Chemical Industry Co., Ltd. Liquid crystal compound. 4,710,585, Cl. 560-64.000.

Tahbaz, John A. Process for cleaning metal articles. 4,710,232, Cl. 134-1.000.

Taicher, Zvi: *See*—
Strikman, Shmuel, 4,710,713, Cl. 324-303.000.

Taivalkoski, Amy L.: *See*—
Maddox, James F.; Kadonoff, Mark B.; Berger, Alan D.; Taivalkoski, Amy L.; George, Robert W., II; and Benayad-Cherif, Faycal E., 4,710,020, Cl. 356-1.000.

Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, to Green Cross Corporation, The. Continuous type centrifugal separator. 4,710,161, Cl. 494-84.000.

Takagi, Motoyuki: *See*—
Tokumoto, Minoru; Takagi, Motoyuki; Shitaoka, Shizuo; Gold, Samuel; and Iovine, Carmine P., 4,710,526, Cl. 524-5.000.

Takagi, Yoshiyuki; and Kaneaki, Tetsuhiko, to Matsushita Electric Industrial Co., Ltd. Electronic musical instrument for generating a natural musical tone. 4,709,611, Cl. 84-1.220.

Takahashi, Akio: *See*—
Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, 4,710,854, Cl. 361-414.000.

Takahashi, Junya; Kato, Toshiro; and Kamoshita, Katsuzo, to Sumitomo Chemical Company, Limited. Fungicidal carbamates and thiolcarbamates. 4,710,514, Cl. 514-485.000.

Takahashi, Kenji; Umemoto, Chiyuki; and Kato, Hisatoyo, to Fuji Photo Film Co., Ltd. Radiation image recording and read-out method and apparatus. 4,710,626, Cl. 250-327.200.

Takahashi, Koji: *See*—
Aotsuka, Yasuo; Konishi, Masahiro; and Takahashi, Koji, 4,710,631, Cl. 250-354.100.

Takahashi, Susumu: *See*—
Usagawa, Toshiyuki; Ono, Yuichi; and Takahashi, Susumu, 4,710,787, Cl. 357-16.000.

Takahashi, Yoshio: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Takai, Sakan: *See*—
Maegawa, Harumi; Takai, Sakan; Sukeda, Toshiaki; Irie, Shoji; and Kobata, Shoichi, 4,710,895, Cl. 365-2.000.

Takaishi, Naotake: *See*—
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.

Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, to Canon Kabushiki Kaisha. Optical recording medium. 4,710,418, Cl. 428-192.000.

Takano, Masami; and Tamura, Yukio, to Sawafuji Electric Co., Inc. Resin molded rotor for a magneto generator. 4,710,659, Cl. 310-153.000.

Takaoka, Yoshitsugu: *See*—
Takabayashi, Kuniaki; Takaoka, Yoshitsugu; Hori, Kouichi; Shimotakahara, Masaki; Okada, Kikujiro; and Shiino, Satoru, 4,710,161, Cl. 494-84.000.

Takara Co., Ltd.: *See*—
Nagaoka, Junichi, 4,710,148, Cl. 446-464.000.
Wakase, Hiroshi, 4,710,147, Cl. 446-464.000.

Takasuka, Yutaka; Mohri, Kunihiko; and Kawaguchi, Akiko, to Pola Chemical Industries Inc. Stick cosmetics containing coated pearlescent pigments. 4,710,375, Cl. 424-69.000.

Takeda Chemical Industries, Ltd.: *See*—
Nojima, Shoshichi; Nomura, Hiroaki; and Okutani, Tetsuya, 4,710,579, Cl. 558-169.000.

Takeda, Fuchio; Matsushiro, Hiroyuki; Kobayashi, Kazuo; and Kaneko, Toshio, to Ricoh Company, Ltd. Developing apparatus. 4,710,015, Cl. 355-3.0DD.

Takeda, Makoto; Nonomura, Keisaku; and Yamamoto, Kunihiko, to Sharp Kabushiki Kaisha. Liquid crystal display with switching transistor for each pixel. 4,710,768, Cl. 340-805.000.

Takeda, Rikio: *See*—
Yamazaki, Shinsuke; Takeda, Rikio; and Uda, Iwao, 4,710,349, Cl. 420-495.000.

Takehara, Shin, to Nissan Motor Co., Ltd. Vibration damping system for power unit. 4,709,779, Cl. 180-300.000.

Takeshita, Tetsurou: *See*—
Harase, Jiro; Ohta, Kuniteru; Takeshita, Tetsurou; and Endo, Michio, 4,709,742, Cl. 164-76.100.

Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, to Mitsubishi Jukogyo Kabushiki Kaisha; and Bando Chemical Industries, Inc. Apparatus for molding a belt for transmitting power. 4,710,255, Cl. 156-361.000.

Takeuchi, Kunio, to Tokai TRW & Co., Ltd. Steering mechanism for automobile. 4,709,593, Cl. 74-498.000.

Takeuchi, Toshio, to Toyo Menka Kaisha, Ltd. Flexible optical fibers for use in viewing devices. 4,709,985, Cl. 350-96.250.

Takigawa, Masuhiko: *See*—
Takigawa, Shigetsugu; and Takigawa, Masuhiko, 4,709,480, Cl. 30-254.000.

Takigawa, Shigetsugu; and Takigawa, Masuhiko, to ARS Edge Co. Ltd. Scissors. 4,709,480, Cl. 30-254.000.

Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Rear wheel steering system. 4,709,935, Cl. 280-91.000.

Tamai, Yasuo: *See*—
Ono, Toshio; Tamai, Yasuo; Mizuno, Chiaki; Ogawa, Hiroshi; and Saito, Shinji, 4,710,421, Cl. 428-213.000.

Tamamizu, Teruyasu; Sato, Kichihei; Tanaka, Takashi; and Sato, Shunkichi, to Toshiba Ceramics Co., Ltd. Sintered silicon carbide porous body impregnated with metallic silicon. 4,710,428, Cl. 428-408.000.

Tamata, Shin: *See*—
Horiuchi, Susumu; and Tamata, Shin, 4,710,318, Cl. 252-628.000.

Tamburello, Mario: *See*—
Spodati, Fabrizio; and Tamburello, Mario, 4,709,979, Cl. 350-96.200.

Tamura, Hifumi: *See*—
Ishitani, Tohru; Todokoro, Hideo; Kawanami, Yoshimi; and Tamura, Hifumi, 4,710,632, Cl. 250-396.00R.

Tamura, Tadashi: *See*—
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.

Tamura, Tatsuo: *See*—
Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, 4,710,509, Cl. 514-384.000.

Tamura, Yukio: *See*—
Takano, Masami; and Tamura, Yukio, 4,710,659, Cl. 310-153.000.

Tamworth, Inc.: *See*—
Littleton, Jody; and Davis, Gary W., 4,709,719, Cl. 137-268.000.

Tanabe, Hisayuki: *See*—
Hayashi, Seiichi; Nakamura, Takashi; and Tanabe, Hisayuki, 4,710,782, Cl. 346-76.00R.

Tanaka, Katsuhiko; and Fukumoto, Hiroshi, to Canon Kabushiki Kaisha. Toner, charge-imparting material and composition containing triazine type compound. 4,710,443, Cl. 430-106.600.

Tanaka, Kazuo, to Canon Kabushiki Kaisha. Camera system with lens coupling member. 4,710,007, Cl. 354-286.000.

Tanaka Machine Industries Co., Ltd.: *See*—
Ichihara, Eiichi; and Iwai, Itsuo, 4,709,667, Cl. 123-90.340.

Tanaka, Ryuichi; and Ishii, Akira, to Nippon Air Brake Co., Ltd. Fluid pressure control apparatus for reducing swing or fall of vehicle body due to braking during backwards running of vehicle. 4,709,968, Cl. 303-6.00C.

Tanaka, Satoshi; and Imaizumi, Haruo, to Junkosha Co., Ltd. Corrosive liquid leak detecting sensor. 4,710,353, Cl. 422-68.000.

Tanaka, Seietsu, to Oki Electric Industry Co., Ltd. Erasable and programable read only memory devices. 4,710,797, Cl. 357-74.000.

Tanaka, Shinsaku; and Kido, Kunio, to Tanashin Denki Co., Ltd. Reel receiving device. 4,709,871, Cl. 242-68.300.

Tanaka, Takashi: *See*—
Tamamizu, Teruyasu; Sato, Kichihei; Tanaka, Takashi; and Sato, Shunkichi, 4,710,428, Cl. 428-408.000.

Tanashin Denki Co., Ltd.: *See*—
Tanaka, Shinsaku; and Kido, Kunio, 4,709,871, Cl. 242-68.300.

Tani, Masanori: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Taniguchi, Tomizo: *See*—
Matsumoto, Fujio; Doi, Hajime; Mizushima, Kunio; Funahashi, Masaya; Taniguchi, Tomizo; and Sakamoto, Shoichi, 4,709,816, Cl. 206-444.000.

Tanner, Jay: *See*—
Birnbach, Curtis; and Tanner, Jay, 4,710,939, Cl. 372-73.000.

Tarascon, Jean-Marie, to Bell Communications Research, Inc. Secondary lithium battery including a lithium molybdate cathode. 4,710,439, Cl. 429-194.000.

Taravella, Jody J.: *See*—
Astley, Vivian C.; and Taravella, Jody J., 4,710,366, Cl. 423-321.00R.

Tardy, John, to American Telephone and Telegraph Company AT&T Technologies, Inc. Off-line series type regulating power supply. 4,710,697, Cl. 323-239.000.

Tashiro, Yutaka; and Sano, Shoichi, to Honda Giken Kogyo Kabushiki Kaisha. Steering assembly for motor vehicle. 4,709,936, Cl. 280-91.000.

Tassi, Lamberto: *See*—
Ballestrazzi, Aris; and Tassi, Lamberto, 4,709,530, Cl. 53-209.000.
Ballestrazzi, Aris; and Tassi, Lamberto, 4,709,537, Cl. 53-550.000.

Tate & Lyle Public Limited Company: *See*—
Bateman, John R.; Goodacre, Brita C.; and Smithson, Alan, 4,710,231, Cl. 127-30.000.

Tatsuta, Kuniaki: *See*—
Otake, Noboru; Tatsuta, Kuniaki; Mizobuchi, Shigeyuki; Komeshima, Nobuyasu; Nakajima, Shohachi; Kawai, Hiroyuki; and Odagawa, Atsuo, 4,710,564, Cl. 536-6.400.

Taub, Alan I.: *See*—
Huang, Shyh-Chin; Chang, Keh-Minn; and Taub, Alan I., 4,710,247, Cl. 148-429.000.

Taube, Thomas: *See*—
Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, 4,710,607, Cl. 219-121.00P.

Tauc, Jan; Maris, Humphrey J.; and Thomsen, Christian, to Bw Brown University Research Foundation. Optical generator and detector of stress pulses. 4,710,030, Cl. 356-432.000.

Taylor, Hugh F.; and Theobald, David R., to Utec B.V. Air weapon with gas-tight expansion chamber. 4,709,686, Cl. 124-67.000.

Taylor, Lawrence D., to Brandt, Inc. Electronic controller for dispensers and the like. 4,709,914, Cl. 271-263.000.

Taylor, Monroe F., to W. R. Grace & Co., Cryovac Div. Vertical form-fill seal process and machine with product catching device. 4,709,532, Cl. 53-451.000.

Tazaki, Satoru, to Clarion Co., Ltd. Circuit for controlling separation and high-cut operation of a stereo demodulator in an FM radio receiver. 4,710,958, Cl. 381-10.000.

TDK Corporation: *See*—
Iizuka, Michio; and Shiba, Haruo, 4,710,839, Cl. 360-133.000.

Team, Inc.: *See*—
Harrison, George W., 4,709,729, Cl. 138-99.000.

TechnoARBED Deutschland GmbH: *See—*
Altmeyer, Werner; Jakobs, Ewald; and Meier, Friedrich, 4,710,078, Cl. 409-233.000.
Tecle, Haile: *See—*
Bergmeier, Stephen C.; Downs, David A.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,710,508, Cl. 514-357.000.
Tecnoma: *See—*
Ballu, Patrick J. M., 4,710,109, Cl. 417-454.000.
Teepak, Inc.: *See—*
Stanley, Thomas R.; and Zeleznik, Mark R., 4,709,450, Cl. 17-49.000.
Teijin Limited: *See—*
Imamura, Tosuke, 4,710,423, Cl. 428-272.000.
Nishimura, Kunio; and Hirakawa, Tadashi, 4,710,432, Cl. 428-542.800.
Teikoku Chemical Industry Co., Ltd.: *See—*
Taguchi, Masaaki; and Suenaga, Hitoshi, 4,710,585, Cl. 560-64.000.
Tejima, Toru: *See—*
Nakamura, Koichi; Hattori, Michihiro; Tamura, Tadashi; Tejima, Toru; Takaishi, Naotake; Imokawa, Genji; and Hotta, Hajime, 4,710,373, Cl. 424-59.000.
Teledyne Industries Inc.: *See—*
Philpot, James E., 4,709,573, Cl. 72-379.000.
Telefonaktiebolaget LM Ericsson: *See—*
Ekdahl, Per A. A., 4,710,590, Cl. 174-35.0GC.
Telefunken Electronic GmbH: *See—*
Waschler, Eckehard; Clauss, Hermann; and Hefner, Heinz-Achim, 4,710,264, Cl. 437-228.000.
Telettra-Telefonia Elettronica e Radio S.p.A.: *See—*
Spodati, Fabrizio; and Tamburello, Mario, 4,709,979, Cl. 350-96.200.
Tellden, Leif: *See—*
Skoog, Hans; Holmqvist, Ulf; and Tellden, Leif, 4,710,092, Cl. 414-729.000.
Templex, Inc.: *See—*
Jones, Christopher R.; and Jones, Lee S., 4,709,645, Cl. 112-282.000.
Tennant Company: *See—*
Basham, Michael T.; Berdahl, Robert M.; and Field, Bruce E., 4,709,771, Cl. 180-6.500.
Tensor, Inc.: *See—*
Walters, Philip H., 4,709,486, Cl. 33-304.000.
Teraoka Seiko Co., Ltd.: *See—*
Denda, Toshio, 4,709,531, Cl. 53-415.000.
Terasawa, Hidenori; to Nippon Kogaku K. K. Zoom lens. 4,709,997, Cl. 350-427.000.
Terashita, Takaaki, to Fuji Photo Film Co., Ltd. Photographic printer and method for determining exposure amount thereof. 4,710,019, Cl. 355-38.000.
Terashita, Takaaki: *See—*
Suzuki, Kenji; Terashita, Takaaki; and Murayama, Jin, 4,710,803, Cl. 358-41.000.
Terpinski, Eva A.: *See—*
Evans, Sean A.; Terpinski, Eva A.; and Testa, Douglas, 4,710,376, Cl. 424-83.000.
Testa, Douglas: *See—*
Evans, Sean A.; Terpinski, Eva A.; and Testa, Douglas, 4,710,376, Cl. 424-83.000.
Tetra Pak International AB: *See—*
Ljungberg, Per-Allan, 4,709,799, Cl. 198-412.000.
Texaco Inc.: *See—*
Nieh, Edward C. Y., 4,710,362, Cl. 423-228.000.
Texas Instruments Incorporated: *See—*
Bellay, Jeffrey D.; and Powell, Theo J., 4,710,931, Cl. 371-25.000.
Franke, David W.; and Hall, Carroll R., 4,710,763, Cl. 340-723.000.
Hornbeck, Larry J., 4,710,732, Cl. 332-7.510.
Powell, Theo J.; Bellay, Jeffrey D.; Daniels, Martin D.; and Hwang, Yin-Chao, 4,710,933, Cl. 371-25.000.
Traynor, Kevin, 4,710,934, Cl. 371-38.000.
Wilson, Arthur M., 4,709,468, Cl. 437-209.000.
Witter, David E.; and Bawa, Mohendra S., 4,710,260, Cl. 156-605.000.
Tezuka, Tomofumi: *See—*
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, 4,709,554, Cl. 62-156.000.
TFT, Inc.: *See—*
Wu, Joseph C.; Law, Yee-Shing; and James, John, 4,710,970, Cl. 455-113.000.
Thammana, Pallaiah: *See—*
Schenkel, Robert H.; Wong, Rosie B.; and Thammana, Pallaiah, 4,710,377, Cl. 424-88.000.
Thefaine, Yannick J.: *See—*
Friedman, Lee G.; Hailpern, Brent T.; Hoevel, Lee W.; and Thefaine, Yannick J., 4,710,769, Cl. 340-825.030.
Theobald, David R.: *See—*
Taylor, Hugh F.; and Theobald, David R., 4,709,686, Cl. 124-67.000.
Theodore, Ares N.: *See—*
Chattha, Mohinder S.; and Theodore, Ares N., 4,710,543, Cl. 525-161.000.
Theofanis, Nicholas D.: *See—*
Stemler, J. Robert; Klingensmith, James D.; Menzemer, Craig C.; Kulicki, John M.; and Theofanis, Nicholas D., 4,709,435, Cl. 14-73.000.
Thien, Tran V., to Minnesota Mining and Manufacturing Company. Azine redox dyes and leuco azine dyes. 4,710,570, Cl. 544-31.000.
Thomas, Gunter: *See—*
Franckowiak, Gerhard; Bechem, Martin; Gross, Rainer; Kayser, Michael; Schramm, Matthias; and Thomas, Gunter, 4,710,501, Cl. 514-256.000.
Thompson, Glenn M., to Tracer Research Corporation. System for continuously monitoring for leaks in underground storage tanks. 4,709,577, Cl. 73-40.700.
Thompson, Mortimer S., to Tri-Tech Systems International Inc. Tamper evident plastic caps with lower separable or breakaway portions and a method of forming them. 4,709,824, Cl. 215-252.000.
Thompson, Thomas C.; and Harrison, David J., to Quest Medical, Inc. Automated drug additive infusion system. 4,710,166, Cl. 604-81.000.
Thomsen, Christian: *See—*
Tauc, Jan; Maris, Humphrey J.; and Thomsen, Christian, 4,710,030, Cl. 356-432.000.
Thomson Video Equipment: *See—*
Van Cang, Luc P., 4,710,764, Cl. 340-728.000.
Thomson—CSF: *See—*
Blanchard, Pierre, 4,710,234, Cl. 437-40.000.
Thorn Emi plc: *See—*
Halberstadt, Alex L.; and Hume, Roger A., 4,710,677, Cl. 313-580.000.
Thorn, Richard P. Quiet fluid filled vibration isolator. 4,709,907, Cl. 267-140.100.
Thornburg, Dennis D.; and Parenteau, Richard R. Combination smoke detector and device for containing air. 4,710,756, Cl. 340-628.000.
TI Gas Spares Limited: *See—*
Barnes, Hugh V., 4,709,687, Cl. 126-42.000.
Ticehurst, Roy M.; and Watson, Joseph L., to Davy McKee (Poole) Limited. Lubrication of rolling mills. 4,709,568, Cl. 72-201.000.
Tickner, Derek C.: *See—*
Kortschinski, Juri; Lat, Michael V.; Maurice, Claude G.; and Tickner, Derek C., 4,710,847, Cl. 361-125.000.
Timper, Joachim: *See—*
Cremosnik, Gregor; Timper, Joachim; and Holzberger, Johann, 4,709,875, Cl. 244-3.130.
Tingley, Eddie S., to Novus Inc. Glass scratch removal method. 4,709,513, Cl. 51-283.00R.
Tinti, Aldo A., to Avco Corporation. Stator assembly for gas turbine engine. 4,710,097, Cl. 415-138.000.
Titley, Mark C., to British Aerospace PLC. Fin assembly deployment spring. 4,709,878, Cl. 244-328.000.
Tittizer, Gabriel; Junghans, Ewald; Bestenreiner, Georg; and Dahm, Christian, to Interatom GmbH. Double-conical static pressure-type gas bearing. 4,710,034, Cl. 384-110.000.
Todokoro, Hideo: *See—*
Ishitani, Tohru; Todokoro, Hideo; Kawanami, Yoshimi; and Tamura, Hifumi, 4,710,632, Cl. 250-396.00R.
Tokai TRW & Co., Ltd.: *See—*
Takeuchi, Kunio, 4,709,593, Cl. 74-498.000.
Tokairin, Hiroaki; Honma, Kazuo; Nakajima, Kichio; Nagasawa, Kiyoshi; and Aritake, Takeshi, to Hitachi Construction Machinery Co., Ltd. Device for compensating for deflection in a pliable positioning apparatus. 4,710,884, Cl. 364-513.000.
Tokita, Yasuhiro: *See—*
Fuke, Akira; Tokita, Yasuhiro; and Masuda, Katsuhiko, 4,710,938, Cl. 372-56.000.
Tokumoto, Minoru; Takagi, Motoyuki; Shitaoka, Shizuo; Gold, Samuel; and Iovine, Carmine P., to National Starch and Chemical Corporation. Alkaline curing emulsions for use in cement admixtures. 4,710,526, Cl. 524-5.000.
Tokunaga, Kenji: *See—*
Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, 4,710,255, Cl. 156-361.000.
Tokyo Electric Co., Ltd.: *See—*
Matsushita, Tsuyoshi, 4,710,043, Cl. 400-144.200.
Nakayama, Tetsuroh, 4,710,784, Cl. 346-140.00R.
Tokyo Juki Industrial Co., Ltd.: *See—*
Fujihara, Masaaki; Fujii, Ikunori; and Fujita, Shuji, 4,709,644, Cl. 112-237.000.
Tomasic, Nicholas A.: *See—*
Heyne, Carl J.; and Tomasic, Nicholas A., 4,710,739, Cl. 335-174.000.
Tomcufcik, Andrew S.: *See—*
Wright, William B., Jr.; and Tomcufcik, Andrew S., 4,710,502, Cl. 514-259.000.
Tomimori, Kiyoshi: *See—*
Soeda, Kazuhiko; Mori, Masakazu; Nishikawa, Tsutomu; and Tomimori, Kiyoshi, 4,710,022, Cl. 356-73.100.
Tominaga, Akira; and Nishida, Reiziro, to Kansai Paint Co., Ltd. [Poly]imidazoline adduct for electrocoating. 4,710,561, Cl. 528-111.000.
Tomioka, Hisatsugu; Waki, Tatsuo; and Miyata, Yoshiki, to Lonseal. Apparatus for installing escape device for slowly lowering a body. 4,709,783, Cl. 182-8.000.
Tomita, Seisuke; and Hashimoto, Takatsugu, to Bridgestone Corporation. Process for molding and vulcanizing rubber products. 4,710,541, Cl. 525-104.000.
Tomono, Hiroshi: *See—*
Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Machara, Yasuhiro; and Yasumoto, Kunio, 4,709,572, Cl. 72-366.000.

Tompkins, E. Neal; Arends, Thomas C.; and Barry, Michael W., to Datapoint Corporation. Video conferencing network. 4,710,917, Cl. 370-62.000.

Tonoki, Satoshi; Tsunemi, Hidenari; Nishimura, Asaichi; and Abe, Kunihisa, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Unsaturated polyester resin compositions. 4,710,420, Cl. 428-212.000.

Toppan Printing Co., Ltd: *See—*
Nakamura, Junji; Nishimura, Ikuma; Saito, Goro; and Matsumoto, Kozo, 4,710,436, Cl. 429-41.000.

Tosaka, Akio; Hashiguchi, Koichi; Morita, Masahiko; and Okano, Shinobu, to Kawasaki Steel Corporation. Method and system for cooling strip. 4,709,557, Cl. 62-373.000.

Tosaka, Yoichi; and Shimizu, Masami, to Canon Kabushiki Kaisha. Camera with operation switch. 4,710,008, Cl. 354-289.100.

Toshiba Ceramics Co., Ltd.: *See—*
Tamamizu, Teruyasu; Sato, Kichihei; Tanaka, Takashi; and Sato, Shunkichi, 4,710,428, Cl. 428-408.000.

Toshiba Kikai Kabushiki Kaisha: *See—*
Hakata, Yoshitami; Wakuda, Masanori; and Suzuki, Kimio, 4,710,770, Cl. 340-870.180.

Toth Aluminum Corporation: *See—*
Bergman, Lee H., 4,710,369, Cl. 423-625.000.

Tovarny Strojirenske Techniky Koncern: *See—*
Bis, Josef; and Petrzelka, Antonin, 4,709,434, Cl. 12-77.000.

Townsend Engineering Company: *See—*
Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., 4,709,447, Cl. 17-1.00F.

Townsend, Ray T.; Smith, David W.; and Dykes, Robert M., to Townsend Engineering Company. Encased product and method and apparatus for encasing same. 4,709,447, Cl. 17-1.00F.

Toyo Contact Lens Co., Ltd.: *See—*
Miyajima, Nobuyuki; Hata, Kenji; and Nakayama, Junichi, 4,710,313, Cl. 252-105.000.

Toyo Menka Kaisha, Ltd.: *See—*
Takeuchi, Toshio, 4,709,985, Cl. 350-96.250.

Toyo Seikan Kaisha, Ltd.: *See—*
Ochiai, Toshio; Tsujimura, Akio; and Tsukiyasu, Hiroshi, 4,710,091, Cl. 414-623.000.

Toyoda Gosei Co., Ltd.: *See—*
Hongo, Suzuaki; Niwa, Minoru; Hashiba, Takahiro; Harata, Mitsuru; Hirata, Ichiro; Ito, Isamu; and Sonobe, Akihiko, 4,709,944, Cl. 280-777.000.
Sakamoto, Fujio, 4,709,967, Cl. 301-37.00P.

Toyoda Koki Kabushiki Kaisha: *See—*
Yoneda, Takao; Ogasawara, Tadashi; Ohta, Norio; and Sakakibara, Yasuji, 4,709,509, Cl. 51-165.710.

Toyoshima, Takefumi: *See—*
Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, 4,709,898, Cl. 248-562.000.

Toyota Jidosha Kabushiki Kaisha: *See—*
Ichikawa, Noriyuki; Suzuki, Tetsushi; and Atsumi, Tomiaki, 4,710,152, Cl. 474-166.000.
Kato, Kichiro, 4,709,682, Cl. 123-559.000.
Noda, Naoki; Nihashi, Iwao; and Sato, Kazuhiro, 4,710,608, Cl. 219-161.000.
Yasue, Hideki; and Fukumura, Kagenori, 4,709,597, Cl. 74-868.000.

Toyota Jidoshi Kabushiki Kaisha: *See—*
Iyoda, Motomi, 4,710,878, Cl. 364-424.000.

Toyotomi Kogyo Co., Ltd.: *See—*
Nakamura, Kazuharu; Matsumoto, Motoki; Kondo, Akinobu; and Ito, Kiyonobu, 4,710,125, Cl. 431-22.000.

Tracer Research Corporation: *See—*
Thompson, Glenn M., 4,709,577, Cl. 73-40.700.

Tran-Van, Khanh: *See—*
Rutschmann, Erwin; Tran-Van, Khanh; and Wagner, Joachim, 4,709,552, Cl. 60-600.000.

Tranter, Donald F.: *See—*
Dawes, Cyril; and Tranter, Donald F., 4,710,238, Cl. 148-16.600.

Traynor, Kevin, to Texas Instruments Incorporated. Random access memory with error correction capability. 4,710,934, Cl. 371-38.000.

Tri-Tech Systems International Inc.: *See—*
Thompson, Mortimer S., 4,709,824, Cl. 215-252.000.

Trimborn, Werner: *See—*
Lechtken, Peter; Buethe, Ingolf; Jacobi, Manfred; and Trimborn, Werner, 4,710,523, Cl. 522-14.000.

Trippel, Gerhard: *See—*
Bandara, Upali; Hinkel, Holger; Steiner, Werner; and Trippel, Gerhard, 4,710,424, Cl. 428-325.000.

Troncoso De Liotta, Holga E.: *See—*
Liotta, Domingo S.; and Troncoso De Liotta, Holga E., 4,710,192, Cl. 623-1.000.

Troponwerke GmbH & Co., KG: *See—*
Lockhoff, Oswald; Stadler, Peter; Opitz, Hans-Georg; Horstmann, Harald; Junge, Bodo; and Pelster, Bernhard, 4,710,491, Cl. 514-42.000.

Truglio, Diana, to Medtech Diagnostics Inc. Lavage device for obtaining a fluid specimen from a body cavity for disease diagnosis. 4,709,705, Cl. 128-750.000.

Trutzschler GmbH & Co. KG: *See—*
Leifeld, Ferdinand, 4,709,451, Cl. 19-105.000.

TRW Inc.: *See—*
Burk, Maksymilian; and Blumenthal, Jack L., 4,710,483, Cl. 502-185.000.
Lindeman, Richard J., 4,710,133, Cl. 439-92.000.

Tsuchiya, Akira, to Kabushiki Kaisha Toshiba. Ripple-free DC high voltage generating apparatus for X-ray tube. 4,710,860, Cl. 363-28.000.

Tsuda, Ichiro: *See—*
Yamaguchi, Youko; Shimizu, Hiroshi; Tsuda, Ichiro; Yano, Masafumi; and Okumura, Tokiko, 4,710,964, Cl. 382-17.000.

Tsujimura, Akio: *See—*
Ochiai, Toshio; Tsujimura, Akio; and Tsukiyasu, Hiroshi, 4,710,091, Cl. 414-623.000.

Tsukishima Kikai Co., Ltd.: *See—*
Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, 4,710,215, Cl. 62-532.000.

Tsukiyasu, Hiroshi: *See—*
Ochiai, Toshio; Tsujimura, Akio; and Tsukiyasu, Hiroshi, 4,710,091, Cl. 414-623.000.

Tsunemi, Hidenari: *See—*
Tonoki, Satoshi; Tsunemi, Hidenari; Nishimura, Asaichi; and Abe, Kunihisa, 4,710,420, Cl. 428-212.000.

Tsuno, Nobuo: *See—*
Matsui, Minoru; and Tsuno, Nobuo, 4,709,621, Cl. 92-212.000.

Tsunoda, Arihiro: *See—*
Watanabe, Toshio; Tsutsui, Eiji; and Tsunoda, Arihiro, 4,710,017, Cl. 355-8.000.

Tsuruta, Koji: *See—*
Ohkoshi, Akio; Tsuruta, Koji; Nakagawa, Hideaki; and Shimada, Satoshi, 4,710,765, Cl. 340-781.000.

Tsutsui, Eiji: *See—*
Watanabe, Toshio; Tsutsui, Eiji; and Tsunoda, Arihiro, 4,710,017, Cl. 355-8.000.

Tsuyoshi, Toshiaki; Yonezawa, Seiji; Kasai, Masuo; and Uno, Motoo, to Hitachi, Ltd. Phase compensation apparatus for an optical information recording and reproducing system. 4,710,909, Cl. 369-46.000.

Tuck, Frederick R.: *See—*
Kelly, John E.; Jones, Don C.; Tuck, Frederick R.; Zimmermann, William A.; and Clark, Kenneth R., 4,710,031, Cl. 356-440.000.

Tucker, Dalton R., to Arcoa Industries. Shoe butler with heel gripping device. 4,709,839, Cl. 223-119.000.

Tucker, James L.; Landen, Terry R.; and Schelby, Robert L., to Nebco, Inc. Cage positioning device for use with a concrete pipe form. 4,710,115, Cl. 425-117.000.

Turchi, Sergio; and Filippi, Renato, to Weber S.p.A. Azienda Altecna. Device for controlling fuel injection apparatus in diesel engines. 4,709,680, Cl. 123-467.000.

Turcsanyi, Peter: *See—*
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.

Turro, Juan G. Cigarette holder. 4,709,706, Cl. 131-240.100.

Tyler, Derek E.: *See—*
Young, Kenneth P.; Tyler, Derek E.; Cheskis, Harvey P.; and Watson, W. Gary, 4,709,746, Cl. 164-485.000.

Uchida, Seiju: *See—*
Degawa, Toru; Okuyama, Gen; Hashimoto, Akio; Uchida, Seiju; Fujiwara, Kouzou; Ebata, Makoto; Satou, Takashi; and Ototani, Tohei, 4,710,481, Cl. 501-123.000.

Uchida, Yukimasa, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 4,710,905, Cl. 365-229.000.

Uchino, Eiji. Elevator. 4,709,787, Cl. 187-56.000.

Uda, Iwao: *See—*
Yamazaki, Shinsuke; Takeda, Rikio; and Uda, Iwao, 4,710,349, Cl. 420-495.000.

Uda, Tadayoshi: *See—*
Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, 4,709,714, Cl. 134-89.000.

Uecker, Ronald T.; and Slicker, Steven D., to MILSCO Manufacturing Company. Adjustable office chair. 4,709,963, Cl. 297-316.000.

Ueda, Akihisa, to Hitachi, Ltd. Method and apparatus for detecting the uncontrollable operation of a control system. 4,710,928, Cl. 371-16.000.

Ueda, Yasuyoshi: *See—*
Hattori, Makoto; Nishikuri, Masao; and Ueda, Yasuyoshi, 4,710,320, Cl. 260-378.000.

Uenishi, Noboru: *See—*
Doi, Yoshihiko; Kuroishi, Nobuhito; Ochi, Shigeki; and Uenishi, Noboru, 4,710,345, Cl. 419-28.000.

Ueno, Masakazu, to Fuji Electric Co., Ltd. Liquid crystal matrix display device having opposed diode rings on substrates. 4,709,992, Cl. 350-339.00R.

Ueno, Shyuichi: *See—*
Machida, Toyoji; and Ueno, Shyuichi, 4,709,472, Cl. 29-623.000.

Ueno, Takashi; and Abo, Toshimi, to Nissan Motor Co., Ltd. Method of and apparatus for controlling supercharge pressure for a turbocharger. 4,709,553, Cl. 60-602.000.

Uenohara, Norihisa, to Kabushiki Kaisha Daikin Seisakusho. Torsion rubber type damper disc. 4,709,796, Cl. 192-106.100.

Uetsuki, Haruo; Kobayashi, Takehiro; and Yamane, Hiroto, to Ryobi, Ltd. Device for preventing backlash on a fishing reel. 4,710,689, Cl. 318-630.000.

Uhlir, Pavel: *See—*
Curda, Otakar; Maxa, Jaroslav; and Uhlir, Pavel, 4,710,646, Cl. 307-116.000.

Uiterwaal, Dirk J. D.; and Hersevoort, Aart, to Melkunte Holland B.V. Nutritional supplement preparation intended for pregnant and breast-

feeding women based on milk constituents as well as a process for preparing it. 4,710,387, Cl. 426-72.000.
Umemoto, Chiyuki: *See*—
Takahashi, Kenji; Umemoto, Chiyuki; and Kato, Hisatoyo, 4,710,626, Cl. 250-327.200.
Umemura, Hiroyuki; Matsuda, Kenji; Tezuka, Tomofumi; Isono, Kazuaki; Ishioka, Hidenori; Matsuoka, Fumio; and Iijima, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Air conditioning apparatus. 4,709,554, Cl. 62-156.000.
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Medical composition for injection containing a spergualin as active ingredient and process for preparing the same. 4,710,517, Cl. 514-616.000.
Umezawa, Takashi; and Watanabe, Koji, to Nifco, Inc. Latch device. 4,709,949, Cl. 292-6.000.
Uni-Grip, Inc.: *See*—
Barth, Russell W.; and Buess, Ronald P., 4,710,416, Cl. 428-119.000.
Union Carbide Corporation: *See*—
Hanson, Thomas C.; Fisher, Theodore F.; and Weber, Joseph A., 4,710,212, Cl. 62-23.000.
Jorgensen, Robert J., 4,710,538, Cl. 525-53.000.
Ward, Thomas H.; Costanzo, Phillip A.; Pietrasz, Vincent; and Soeder, Edmund J., 4,710,344, Cl. 419-8.000.
Union Oil Company of California: *See*—
Harbolt, Bruce; Murata, Perry L.; and Burmaster, Neal C., 4,710,360, Cl. 422-269.000.
Wong, Morton M.; and Shugarman, Arnold L., 4,710,367, Cl. 423-335.000.
Unisys Corporation: *See*—
Kim, Dongsung R.; and Kronies, Reinhard K., 4,710,935, Cl. 371-49.000.
Rochester, Charles R., Jr., 4,710,591, Cl. 174-35.0GC.
United States of America
Air Force: *See*—
Aulds, James M.; and Becker, Roger J., 4,710,641, Cl. 250-554.000.
Army: *See*—
Bishop, Daniel E., 4,709,484, Cl. 33-169.00R.
Sluss, Elmer C.; Nettleton, John E.; and Barr, Dallas N., 4,710,941, Cl. 372-87.000.
Energy: *See*—
Christiansen, David W.; and Karnesky, Richard A., 4,710,343, Cl. 376-414.000.
FitzPatrick, John R.; Dunn, Jerry G.; and Avens, Larry R., 4,710,222, Cl. 75-84.10R.
Ohkawa, Tihiro, 4,710,339, Cl. 376-123.000.
Saller, Henry A., deceased; Hodge, Edwin S.; Paprocki, Stanley J.; and Dayton, Russell W., 4,709,848, Cl. 228-159.000.
National Aeronautics and Space Administration: *See*—
Matsumoto, Yutaka; Mina, Cesar; Russell, Philip B.; and van Ark, William B., 4,710,618, Cl. 250-203.00R.
National Security Agency: *See*—
Douglass, Harold E., Jr.; and Mahaffee, Joseph W., III, 4,709,652, Cl. 116-140.000.
Navy: *See*—
Blackburn, Douglas; Feldman, Albert; and Lagakos, Nicholas, 4,709,987, Cl. 350-96.340.
Boblitt, Wayne W., 4,710,076, Cl. 409-26.000.
Saur, Joseph W.; Reynolds, Charles P.; and Black, Alfred T., 4,710,472, Cl. 435-287.000.
Yoder, Max N.; and Wright, George B., 4,710,478, Cl. 437-40.000.
U.S. Philips Corporation: *See*—
Doyen, Daniel; and Vriz, Tarcisio, 4,710,729, Cl. 331-96.000.
Houkes, Henk; Postma, Pieter; and Van Veghel, Andreas C., 4,710,678, Cl. 315-39.000.
Kupfer, Karl-Heinz, 4,710,974, Cl. 455-190.000.
Loy, Fernand R., 4,710,621, Cl. 250-203.00R.
Schroder, Johann; Gawron, Klaus; Bertram, Leo; and Schemmann, Hugo, 4,709,752, Cl. 165-47.000.
Sluyterman, Albertus A. S., 4,710,671, Cl. 313-413.000.
Van Engelen, Petrus P. J.; and Buschow, Kurt H. J., 4,710,431, Cl. 428-457.000.
Van Tol, Maurits W., 4,710,672, Cl. 313-413.000.
Vrijssen, Gerardus A. H. M., 4,710,673, Cl. 313-477.00R.
Warmuth, Otto L.; Johanndeiter, Martin H.; and Raven, Johannes G., 4,710,802, Cl. 358-25.000.
U.S. Product Development Company: *See*—
Adell, Robert, 4,709,525, Cl. 52-718.100.
United Technologies Corporation: *See*—
Stevens, Leonard W.; Siwik, William S.; Moore, William A.; Brown, Wayne M.; and Barnard, Andrew A., 4,709,545, Cl. 60-39.080.
Universita' Degli Studi Di Parma: *See*—
Gardini, Gian P.; and Bocchi, Vittorio, 4,710,400, Cl. 427-121.000.
University of California, The Regents of the: *See*—
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, 4,710,714, Cl. 324-307.000.
University of Delaware, The: *See*—
McCandless, Brian E.; and Birkmire, Robert W., 4,709,466, Cl. 437-5.000.
University of Minnesota, Regents of the: *See*—
Hrushesky, William J. M., 4,709,660, Cl. 119-103.000.
Uno, Motoo: *See*—
Tsuyoshi, Toshiaki; Yonezawa, Seiji; Kasai, Masuo; and Uno, Motoo, 4,710,909, Cl. 369-46.000.
Uno, Sakae: *See*—
Iwai, Shinichi; and Uno, Sakae, 4,710,806, Cl. 358-81.000.
UOP Inc.: *See*—
Cetinkaya, Ismail B.; and Myers, Daniel N., 4,710,357, Cl. 422-144.000.
Polak, Anthony J.; and Beuhler, Allyson J., 4,710,278, Cl. 204-129.000.
Upjohn Company, The: *See*—
Livingston, Douglas A.; and Petre, Janet E., 4,710,565, Cl. 536-16.500.
Uponor AB: *See*—
Nordstrom, Erik G. W., 4,710,337, Cl. 264-508.000.
Uragami, Akira: *See*—
Suzuki, Yasunaga; Matsubara, Toshiaki; and Uragami, Akira, 4,710,842, Cl. 361-88.000.
Urbanski, Jeffrey C.: *See*—
Anderson, Philip M., III; and Urbanski, Jeffrey C., 4,710,709, Cl. 324-207.000.
Urbschat, Ulrich, to Hella KG Hueck & Co. Headlight for motor vehicles. 4,710,855, Cl. 362-66.000.
Uryu, Toshiyuki; and Kato, Takashi, to Celanese Corporation. Process for producing three-dimensionally crosslinked polyester having the liquid crystal structure. 4,710,547, Cl. 525-437.000.
Usagawa, Toshiyuki; Ono, Yuichi; and Takahashi, Susumu, to Hitachi, Ltd. Semiconductor device. 4,710,787, Cl. 357-16.000.
Ushikubo, Masao, to Olympus Optical Co., Ltd. Reagent delivery device. 4,710,355, Cl. 422-100.000.
Ushiro, Seimei, to Fuji Photo Film Co., Ltd. Automatic range finding device. 4,710,011, Cl. 354-403.000.
Utah Scientific Advanced Development Center, Inc.: *See*—
Fearing, Craig; and Orsburn, Michael L., 4,710,800, Cl. 358-22.000.
Utec B.V.: *See*—
Taylor, Hugh F.; and Theobald, David R., 4,709,686, Cl. 124-67.000.
Utley, David L., to National Transdata Systems, Inc. Multi-station data collection system. 4,710,616, Cl. 235-472.000.
Uwajima, Takayuki; and Aisaka, Kazuo, to Kyowa Hakko Kogyo Co., Ltd. Process for producing neuraminidase. 4,710,470, Cl. 435-200.000.
Uzawa, Shigeru: *See*—
Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, 4,710,509, Cl. 514-384.000.
V T P "Maimex": *See*—
Dyakov, Nikola G.; Guguchkova-Yanchuleva, Pravoslava T.; and Benchev, Dimiter V., 4,710,196, Cl. 623-6.000.
Vacca, Joseph P.: *See*—
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., 4,710,504, Cl. 514-267.000.
Vahabzadeh, Hamid, to General Motors Corporation. Ratio control system for a continuously variable transmission. 4,710,879, Cl. 364-424.100.
Valachovic, Richard A.: *See*—
Cox, Frederick E.; Rink, Frederick J., Jr.; and Valachovic, Richard A., 4,710,664, Cl. 310-217.000.
Valencic, Milan D.; and Schaffer, Dennis A., to Westinghouse Electric Corp. Method of making a magnetic core. 4,709,471, Cl. 29-605.000.
Valmet Oy: *See*—
Kamarainen, Jorma, 4,710,060, Cl. 405-166.000.
Valuikas, Antonette G.; and Valuikas, Ralph. Weighted insole. 4,709,921, Cl. 272-119.000.
Valuikas, Ralph: *See*—
Valuikas, Antonette G.; and Valuikas, Ralph, 4,709,921, Cl. 272-119.000.
van Ark, William B.: *See*—
Matsumoto, Yutaka; Mina, Cesar; Russell, Philip B.; and van Ark, William B., 4,710,618, Cl. 250-203.00R.
Vanasse, Robert W., to Interstate Brands Corporation. Package for loaf of bread. 4,709,851, Cl. 229-87.00B.
Van Cang, Luc P., to Thomson Video Equipment. Device for obtaining continuous plots on the screen of a display console controlled by a graphic processor. 4,710,764, Cl. 340-728.000.
Van den Bogaert, Jan A.: *See*—
Leenders, Luc H.; Daems, Eddie R.; and Van den Bogaert, Jan A., 4,710,444, Cl. 430-237.000.
Vandendorpe, James E.: *See*—
Brown, Donald W.; Leth, James W.; and Vandendorpe, James E., 4,710,926, Cl. 371-9.000.
Van Eecke, Roger H.: *See*—
Naaktgeboren, Adrianus; and Van Eecke, Roger H., 4,710,086, Cl. 414-44.000.
Naaktgeboren, Adrianus; and Van Eecke, Roger H., 4,710,087, Cl. 414-44.000.
Vanek, Vaclav: *See*—
Brand, Wilhelm; Vanek, Vaclav; and Jakobec, Franz, 4,710,834, Cl. 360-105.000.
Van Engelen, Petrus P. J.; and Buschow, Kurt H. J., to U.S. Philips Corporation. Magnetooptical recording element and a magnetooptical recording device. 4,710,431, Cl. 428-457.000.
Van Hout, James E.; and Klein, Frank H. Panel displays, framed lighted switch actuators therefor. 4,710,858, Cl. 362-95.000.
Van Mastrigt, Max, to Varian Associates, Inc. Chemical vapor deposition apparatus. 4,709,655, Cl. 118-719.000.

Van Roojen, Jan: *See—*
Lewis, Henry W.; and Van Roojen, Jan, 4,709,465, Cl. 29-568.000.
van Ryswyk, Hal: *See—*
Ellis, Arthur B.; and van Ryswyk, Hal, 4,710,476, Cl. 436-172.000.
Van Tol, Maurits W., to U.S. Philips Corporation. Picture display device. 4,710,672, Cl. 313-413.000.
Van Veghel, Andreas C.: *See—*
Houkes, Henk; Postma, Pieter; and Van Veghel, Andreas C., 4,710,678, Cl. 315-39.000.
van Zanten, Anton: *See—*
Heess, Gerhard; and van Zanten, Anton, 4,709,969, Cl. 303-114.000.
Varco International, Inc.: *See—*
Boyadjieff, George I., 4,709,766, Cl. 175-52.000.
Varian Associates, Inc.: *See—*
Shaka, Athan J., 4,710,718, Cl. 324-309.000.
Van Mastrigt, Max, 4,709,655, Cl. 118-719.000.
Vartoughian, Victor. Applicator bottle with sealing cap. 4,710,048, Cl. 401-269.000.
Vataru, Marcel, to Wynn Oil Company. Bottle cap with seal cutter in top recess. 4,709,822, Cl. 215-216.000.
Vaughn, Mark R., to Board of Regents, The University of Texas System. Inherent variable fluid restrictor. 4,710,035, Cl. 384-115.000.
Veit, Wolfgang: *See—*
Spitznas, Manfred; Reiner, Josef; Veit, Wolfgang; and Kirchhuebel, Rainer, 4,710,000, Cl. 350-516.000.
Veith, Gotz U.: *See—*
Veith, Gustav G.; and Veith, Gotz U., 4,709,870, Cl. 242-68.000.
Veith, Gustav G.; and Veith, Gotz U., to Gustav Georg Veith GmbH & Co. Device for replaceably suspending the winding shaft of a bale of cloth. 4,709,870, Cl. 242-68.000.
Velten & Pulver, Inc.: *See—*
Schneider, Thomas C., 4,710,089, Cl. 414-118.000.
Verhaagen, Ronald J., to Minnesota Mining and Manufacturing Company. Image rotation system. 4,710,004, Cl. 353-81.000.
Verkstads AB Claes Johansson: *See—*
Andersson, Olle, 4,709,592, Cl. 74-493.000.
Vertesi, Csaba; Molnar, Attila; and Guczoghy, Lajos, to Peremartoni Vegyipari Vallalat. Isothiuronium salts. 4,710,578, Cl. 558-4.000.
Vesnaver, Galdino. Water aerating device. 4,710,324, Cl. 261-30.000.
Vetco Gray Inc.: *See—*
Adamek, Frank C.; and Bridges, Charles D., 4,709,933, Cl. 277-167.500.
Morrison, Bertram L., 4,709,725, Cl. 137-614.040.
Vezer, Szilard: *See—*
Kreidl, Janos; Turcsanyi, Peter; Aracs, Zsuzsanna; Stefko, Bela; Meszaros, Judit; Deutsch, Ida; Szilbereky, Jeno; Csizer, Eva; Vezer, Szilard; Bogsch, Erik; Bakos, Jozsef; Szotyori, Laszlo; and Heil, Balint, 4,710,323, Cl. 260-543.00R.
Vickers, Ken M. Combination soap and fish bait. 4,710,385, Cl. 426-1.000.
Vidal, Henri; and Weinreb, Daniel, to Vidal, Henri. Metal strip for use in stabilized earth structures. 4,710,062, Cl. 405-262.000.
Vidriera Monterrey, S.A.: *See—*
Giberti-Fornaciari, Serse, 4,710,218, Cl. 65-260.000.
Vietrogoski, Charles J.; Obarowski, Richard; and McDonough, Paul J., to General Foods Corporation. Apparatus for securely holding a loaf food product during slicing. 4,709,608, Cl. 83-355.000.
Viking Container Company: *See—*
Keady, Peter; and Magennis, Thomas P., 4,709,817, Cl. 206-523.000.
Villanueva, Eliseo H. Machine for manufacturing flat bodies in a continuous line. 4,710,122, Cl. 425-259.000.
Villedieu, Eric: *See—*
Clement, Gilles; and Villedieu, Eric, 4,709,773, Cl. 180-9.320.
Vinuesa, Germain: *See—*
Lebas, Jean-Marie; Rat, Pierre; Dupont, Jean-Marcel; and Vinuesa, Germain, 4,710,329, Cl. 264-3.100.
Virco Mfg. Corporation: *See—*
Chang, Chang, 4,710,049, Cl. 403-23.000.
Vita Center Inc.: *See—*
Champavier, Louis, 4,710,748, Cl. 340-347.0AD.
Vochatzer, Richard L. Stair brackets and stair structure. 4,709,520, Cl. 52-191.000.
Voigt, Jurgen, to Hermann Berstorff Maschinenbau GmbH. Apparatus for granulating plastics materials. 4,710,113, Cl. 425-67.000.
Volk, David. Accommodating intraocular lens and lens series and method of lens selection. 4,710,193, Cl. 623-6.000.
Volk, Joseph F.: *See—*
Chase, Richard P.; Englander, Gary E.; German, Martin A.; and Volk, Joseph F., 4,709,514, Cl. 51-325.000.
Volkswagen AG: *See—*
Rozsas, Tomas, 4,709,681, Cl. 123-531.000.
Voll, Martin A.; Eiskop, Robert K.; and Yankovsky, Kharri I., to Institut Khimii AN. Device for taking samples of bottom sediments from water basins. 4,709,584, Cl. 73-864.440.
von Behrens, Wieland E., to Sequoia-Turner Corporation. Particulate matter analyzing apparatus and method. 4,710,021, Cl. 356-72.000.
von Sivers, Rolf, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Vehicle drive unit. 4,709,778, Cl. 180-292.000.
Voorhis, Roger; Erbs, Daryl G.; Palmer, John M.; and Marris, Derrick A., to Carrier Corporation. Control module cooling. 4,709,560, Cl. 62-508.000.
Vosburgh, Mark G.: *See—*
Berg, Lloyd; and Vosburgh, Mark G., 4,710,274, Cl. 203-51.000.
Berg, Lloyd; and Vosburgh, Mark G., 4,710,275, Cl. 203-51.000.
Vossen, Franz, to Meurer Druck & Carton GmbH. Sheet processing apparatus. 4,710,156, Cl. 493-1.000.
Vossloh-Werke GmbH: *See—*
Overhues, Egon, 4,710,081, Cl. 411-161.000.
Vrijssen, Gerardus A. H. M., to U.S. Philips Corporation. Electron tube envelope assembly with precisely positioned window. 4,710,673, Cl. 313-477.00R.
Vriz, Tarcisio: *See—*
Doyen, Daniel; and Vriz, Tarcisio, 4,710,729, Cl. 331-96.000.
Vu, Cung, to W. R. Grace & Co. Polyurethane coating composition. 4,710,560, Cl. 528-67.000.
Vuillemey, Georges: *See—*
Perrot, Pierre; and Vuillemey, Georges, 4,710,535, Cl. 524-413.000.
Vulcan Tool Company: *See—*
Horn, Charles, deceased; and Jenkins, William R., 4,709,574, Cl. 72-405.000.
W.A. Deutsher Proprietary Limited: *See—*
Lance, Mark A., 4,709,651, Cl. 116-137.00R.
W. Haking Enterprises Limited: *See—*
Wong, Wai C., 4,710,013, Cl. 354-419.000.
W. R. Grace & Co.: *See—*
Chmurny, Alan B.; Gross, Akiva T.; Kupper, Robert J.; and Roberts, Rowena L., 4,710,583, Cl. 560-40.000.
Siadat, Bahram; and Morgan, Charles R., 4,710,539, Cl. 525-59.000.
Vu, Cung, 4,710,560, Cl. 528-67.000.
W. R. Grace & Co., Cryovac Div.: *See—*
Taylor, Monroe F., 4,709,532, Cl. 53-451.000.
Waatanabe, Junji, to Kabushiki Kaisha Toshiba. Developing apparatus. 4,710,016, Cl. 355-4.000.
Wachsmuth, Robert H.; and Brusch, Donald W., to Environmental Tectonics Corporation. Spatial disorientation trainer-flight simulator. 4,710,128, Cl. 434-46.000.
Wacker Chemie GmbH: *See—*
Jira, Reinhard; and Ottlinger, Ralph, 4,710,558, Cl. 528-14.000.
Wacker Silicones Corporation: *See—*
Essinger, James F., Jr., 4,710,559, Cl. 528-15.000.
Wadsworth, Nathaniel G.: *See—*
Wilson, Woody W.; and Wadsworth, Nathaniel G., 4,710,883, Cl. 364-466.000.
Waedt, Gunter: *See—*
Jahn, Herbert; and Waedt, Gunter, 4,710,850, Cl. 361-333.000.
Wagener, Paul W.: *See—*
Harkiewicz, Gary A.; and Wagener, Paul W., 4,710,703, Cl. 324-86.000.
Wagenknecht, Juergen; and Raedisch, Dieter, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. System for securing wedge sockets. 4,709,843, Cl. 227-156.000.
Wagner, David G., to Moore Business Forms, Inc. Mailer including return envelope and remittance stub combined in outer envelope. 4,709,850, Cl. 229-73.000.
Wagner, Joachim: *See—*
Rutschmann, Erwin; Tran-Van, Khanh; and Wagner, Joachim, 4,709,552, Cl. 60-600.000.
Wagner, Richard A.: *See—*
Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., 4,709,833, Cl. 220-319.000.
Wahlberg, Anna-Maija, heiress: *See—*
Wahlberg, Arvo, deceased; and Wahlberg, Anna-Maija, heiress, 4,710,219, Cl. 71-11.000.
Wahlberg, Arvo, deceased; and by Wahlberg, Anna-Maija, heiress. Production method of combined phosphorus fertilizer and soil conditioner. 4,710,219, Cl. 71-11.000.
Wahls, Robert; and Gryp, Dennis, to Sears Manufacturing Co. In-seat suspension. 4,709,896, Cl. 248-550.000.
Wajima, Motoyo: *See—*
Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, 4,710,854, Cl. 361-414.000.
Wakabayashi, Hiroharu; and Niiro, Yasuhiko, to Kokusai Denshin Denwa Co., Ltd. Optical repeater monitoring system. 4,710,976, Cl. 455-601.000.
Wakai, Katsuro: *See—*
Kubo, Kanji; and Wakai, Katsuro, 4,710,894, Cl. 364-900.000.
Wakamiya, Yoshinori; and Sumino, Tomoko, to Mitsubishi Denki Kabushiki Kaisha. Method for setting steel stock discharge temperature of heating furnace in hot rolling line. 4,709,570, Cl. 72-365.000.
Wakase, Hiroshi, to Takara Co., Ltd. Four-wheel drive unit for toy vehicle. 4,710,147, Cl. 446-464.000.
Waki, Kouichirou: *See—*
Boda, Keiji; Waki, Kouichirou; and Yanagisawa, Keizo, 4,709,596, Cl. 74-868.000.
Waki, Tatsuo: *See—*
Tomioka, Hisatsugu; Waki, Tatsuo; and Miyata, Yoshiki, 4,709,783, Cl. 182-8.000.
Wakuda, Masanori: *See—*
Hakata, Yoshitami; Wakuda, Masanori; and Suzuki, Kimio, 4,710,770, Cl. 340-870.180.
Waldo, Russell W.; and Miller, Cardell E., to Ideal Security Hardward Corporation. Method and apparatus for closing a door. 4,709,445, Cl. 16-300.000.
Walega, William, to International Shoe Machine Corporation. Heel molder flanger. 4,709,433, Cl. 12-12.500.
Walinsky, Stanley W., to Pfizer Inc. Substantially homogeneous copolymers of acrylic or methacrylic acid and maleic acid. 4,710,537, Cl. 524-549.000.

Walker, Charles E.: *See*—
Kea, Sandra; and Walker, Charles E., 4,710,567, Cl. 536-119.000.
Walker, Roger: *See*—
Wilkins, David R. G.; Brooker, Reginald D.; Walker, Roger; and Powell, Harry, 4,709,630, Cl. 101-93.220.
Walkow, Arnold M., to Western Atlas International, Inc. Apparatus for nondestructive testing of subsurface piping using three coils with opposing fields. 4,710,711, Cl. 324-221.000.
Walling, Jorg-Hein; Cornibert, Jacques; Baxter, Gordon D.; Bottin, Marie-Francoise; Axiuk, Oleg; and Reed, Phillip J., to Northern Telecom Limited. Telecommunications cable. 4,710,594, Cl. 174-120.0SR.
Wallis, Robert H.; and Pratt, William K., to Compression Labs, Inc. Low bandwidth video teleconferencing system and method. 4,710,813, Cl. 358-136.000.
Walters, Philip H., to Tensor, Inc. Method of determining the orientation of a surveying instrument in a borehole. 4,709,486, Cl. 33-304.000.
Walz, Georg. Method of inserting a tubular or bar-shaped structural member tightly into a location hole in a construction element. 4,709,521, Cl. 52-220.000.
Wamstad, David B., to Honeywell Inc. Pressure transducer package. 4,710,744, Cl. 338-4.000.
Wang Laboratories, Inc.: *See*—
Hereth, Michael R.; and Martin, Patricia A., 4,710,903, Cl. 365-194.000.
Wang, Liang. Flexible element of (dual) wave crest. 4,709,731, Cl. 138-121.000.
Wann, Robert E. Bass boat adjustable seat apparatus. 4,709,649, Cl. 114-363.000.
Ward, Douglas K.; and Moscovitch, Jerry N., to Powerflow, Inc. Splash guard. 4,709,938, Cl. 280-154.50R.
Ward, Thomas H.; Costanzo, Phillip A.; Pietrasz, Vincent; and Soeder, Edmund J., to Union Carbide Corporation. Method of forming a getter assembly. 4,710,344, Cl. 419-8.000.
Warmuth, Otto L.; Johanndeiter, Martin H.; and Raven, Johannes G., to U.S. Philips Corporation. Television receiver including a circuit arrangement for demodulating an NTSC-coded color signal. 4,710,802, Cl. 358-25.000.
Warner-Lambert Company: *See*—
Bergmeier, Stephen C.; Downs, David A.; Moos, Walter H.; Moreland, David W.; and Tecle, Haile, 4,710,508, Cl. 514-357.000.
Ferraro, Frank A., 4,709,477, Cl. 30-50.000.
Schumacher, Robert W.; and Houston, Mary B., 4,710,390, Cl. 426-285.000.
Warner & Swasey Company, The: *See*—
Chase, Richard P.; Englander, Gary E.; German, Martin A.; and Volk, Joseph F., 4,709,514, Cl. 51-325.000.
Warren, David P., to Eastman Kodak Company. Polymers of thiophenyl thioacrylate and thiomethacrylate monomers. 4,710,557, Cl. 526-289.000.
Warren, John B.: *See*—
Broden, David E.; Martwick, Wilford E.; and Warren, John B., 4,709,638, Cl. 102-522.000.
Warren, Leslie F., Jr.; Maus, Louis; and Hall, William F., to Rockwell International Corporation. Method of printing electrically conductive images on dielectric substrates. 4,710,401, Cl. 427-121.000.
Warren, Mark V.: *See*—
Warren, William L.; and Warren, Mark V., 4,709,439, Cl. 15-230.160.
Warren, William L.; and Warren, Mark V. Mounting disk for a floor polisher. 4,709,439, Cl. 15-230.160.
Warzelhan, Volker: *See*—
Bachl, Robert; Warzelhan, Volker; Schweier, Guenther; Gropper, Hans; and Ball, Wolfgang, 4,710,552, Cl. 526-116.000.
Waschler, Eckehard; Clauss, Hermann; and Hefner, Heinz-Achim, to Telefunken Electronic GmbH. Process for manufacturing a semiconductor arrangement. 4,710,264, Cl. 437-228.000.
Wasmoen, Terri L.: *See*—
Gleich, Gerald J.; and Wasmoen, Terri L., 4,710,475, Cl. 436-86.000.
Wason, Thomas D., to Cain Encoder Co. Angular position detector. 4,710,889, Cl. 364-571.000.
Wassenhove, Denis V.: *See*—
Archer, Joel; Wassenhove, Denis V.; Pithouse, Kenneth B.; Buck, Leslie J.; Molyneux, Jeffrey P.; and Bradshaw, Peter S., 4,709,948, Cl. 285-381.000.
Watanabe, Kenichi; Hiruta, Hideshi; and Hiketa, Manabu, to Mazda Motor Corporation. Torque control system for vehicles. 4,709,775, Cl. 180-233.000.
Watanabe, Koji: *See*—
Umezawa, Takashi; and Watanabe, Koji, 4,709,949, Cl. 292-6.000.
Watanabe, Tadashi, to NEC Corporation. Vector processing system. 4,710,867, Cl. 364-200.000.
Watanabe, Toshio; Tsu sui, Eiji; and Tsunoda, Arihiro, to Mita Industrial Co., Ltd. Optical unit holding device for copying machines. 4,710,017, Cl. 355-8.000.
Watanabe, Yoshinori: *See*—
Sasaki, Shinji; Shimoyama, Yujiro; and Watanabe, Yoshinori, 4,710,600, Cl. 200-291.000.
Waters, Mark H.; and Whiteman, Robert N., Jr., to AMP Incorporated. Insert retention members for connectors. 4,709,973, Cl. 439-78.000.
Watson, Gordon. Pushing apparatus, and methods of constructing and utilizing same. 4,709,492, Cl. 37-232.000.
Watson, Joseph L.: *See*—
Ticehurst, Roy M.; and Watson, Joseph L., 4,709,568, Cl. 72-201.000.
Watson, W. Gary: *See*—
Young, Kenneth P.; Tyler, Derek E.; Cheskis, Harvey P.; and Watson, W. Gary, 4,709,746, Cl. 164-485.000.
Wavetek Corporation: *See*—
Fluck, Sydney, Jr.; and Milholland, Marvin L., 4,710,969, Cl. 455-67.000.
Webasto-Werk W. Baier GmbH & Co.: *See*—
Paerisch, Jochen; Herlemann, Werner; and Schaetzler, Walter, 4,709,959, Cl. 296-217.000.
Webb, Michael A., to Schering Agrochemicals Limited. Pesticidal compositions employing stabilized amitraz. 4,710,512, Cl. 514-431.000.
Webb, Ronald J.: *See*—
Connell, Lawrence E.; and Webb, Ronald J., 4,710,724, Cl. 330-9.000.
Webber, Gregory E.: *See*—
Rannigan, Robert C.; and Webber, Gregory E., 4,709,717, Cl. 134-199.000.
Weber, Joseph A.: *See*—
Hanson, Thomas C.; Fisher, Theodore F.; and Weber, Joseph A., 4,710,212, Cl. 62-23.000.
Weber, Jurgen: *See*—
Wissmann, Michael; Weber, Jurgen; and Nickel, Hans, 4,709,669, Cl. 123-149.00D.
Weber, Raviv, to Medical Research & Development Associates. Apparatus for medical treatment by hyperthermia. 4,709,701, Cl. 128-422.000.
Weber S.p.A.: *See*—
Bianchi, Valerio; and Conticelli, Carlo, 4,709,674, Cl. 123-339.000.
Weber S.p.A. Azienda Altecna: *See*—
Turchi, Sergio; and Filippi, Renato, 4,709,680, Cl. 123-467.000.
Webster, James B., to Environmental Protection Systems. Ground fault monitor circuit. 4,710,751, Cl. 340-522.000.
Wedding, Brent M.: *See*—
Borrelli, Nicholas F.; Hares, George B.; Smith, Dennis W.; and Wedding, Brent M., 4,710,430, Cl. 428-432.000.
Weed, Gregory C., to Du Pont de Nemours, E. I., and Company. Photopolymerizable composition containing carboxy benzotriazole. 4,710,262, Cl. 156-630.000.
Weidlich, Erhard: *See*—
Hohmann, Eugen; Mund, Konrad; and Weidlich, Erhard, 4,710,233, Cl. 134-1.000.
Weiler, Wolfgang, to MTU Motoren-und Turbinen-Union GmbH. Cooled gas turbine operable with a controlled cooling air quantity. 4,709,546, Cl. 60-39.290.
Weiner, Hans, to Dr.Ing.h.c.F. Porsche Aktiengesellschaft. Arrangement for testing fuses. 4,710,720, Cl. 324-550.000.
Weinreb, Daniel: *See*—
Vidal, Henri; and Weinreb, Daniel, 4,710,062, Cl. 405-262.000.
Weiss, Arno: *See*—
Junemann, Gitta; Hirsch, Werner; and Weiss, Arno, 4,709,709, Cl. 131-306.000.
Weissman, Sherman M.; and Collins, Francis, to Yale University. Junction-fragment DNA probes and probe clusters. 4,710,465, Cl. 435-91.000.
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, to University of California, The Regents of the; and Weitekamp, Daniel Paul. Method and apparatus for measuring nuclear magnetic properties. 4,710,714, Cl. 324-307.000.
Weitekamp, Daniel Paul: *See*—
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, 4,710,714, Cl. 324-307.000.
Welter, Kenneth F. Shock absorbing assembly for an athletic shoe. 4,709,489, Cl. 36-27.000.
Wepfer, Robert M.: *See*—
Wilson, Robert M.; and Wepfer, Robert M., 4,709,756, Cl. 165-162.000.
Weppner, Werner: *See*—
Schlechtriemen, Gerhard-Ludwig; Hotzel, Gerhard; and Weppner, Werner, 4,710,848, Cl. 361-280.000.
Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See*—
Cremosnik, Gregor; Timper, Joachim; and Holzberger, Johann, 4,709,875, Cl. 244-3.130.
Wermuth, Camille G.; and Chambon, Jean-Pierre, to Sanofi. New derivatives of pyridazine active on the central nervous system. 4,710,499, Cl. 514-247.000.
Wermuth, Stefan; Hauke, Gunter; and Kreher, Klaus, to Merck Patent Gesellschaft mit beschrankter Haftung. Chromatography precolumn. 4,710,289, Cl. 210-198.200.
Wernicke, Ubbo: *See*—
Langen, Hans; Schutz, Heinz-Dieter; Himmelmann, Wolfgang; Wernicke, Ubbo; and Renner, Gunter, 4,710,454, Cl. 430-546.000.
Westerlund, Bengt, to Isaberg AB. Tool for fastening an elongated object on a supporting surface by means of U-shaped clips. 4,709,842, Cl. 227-120.000.
Western Atlas International, Inc.: *See*—
Walkow, Arnold M., 4,710,711, Cl. 324-221.000.
Westinghouse Electric Corp.: *See*—
Csanady, Michael, Jr., 4,709,785, Cl. 184-6.400.
Dollard, Walter J.; Doshi, Pratap K.; and George, Raymond A., 4,710,340, Cl. 376-209.000.
Duncan, Robert; and Widener, Wade H., 4,709,909, Cl. 269-41.000.

Harkiewicz, Gary A.; and Wagener, Paul W., 4,710,703, Cl. 324-86.000.
Heyne, Carl J.; and Tomasic, Nicholas A., 4,710,739, Cl. 335-174.000.
Kilgore, Lee A.; and McKee, Bobby D., 4,710,665, Cl. 310-219.000.
McKee, Bobby D.; Cain, Michael P.; Delvecchio, Robert M.; and Aivaliotis, Emmanuel, 4,710,660, Cl. 310-178.000.
Mussler, James M.; and Swartz, Mark E., 4,710,758, Cl. 340-712.000.
Parker, Merle A.; Pregnall, Richard A.; and Ahmed, Hassan J., 4,709,579, Cl. 73-76.000.
Reid, Stephen R., 4,710,663, Cl. 310-214.000.
Rindal, Roald A.; and McKee, Bobby D., 4,710,666, Cl. 310-248.000.
Sherwin, Gary W., 4,709,702, Cl. 128-644.000.
Soroka, Daniel P.; Swensrud, Roger L.; and Zelezniak, Joseph J., 4,710,606, Cl. 219-121.0LU.
Valencic, Milan D.; and Schaffer, Dennis A., 4,709,471, Cl. 29-605.000.
Wilson, Robert M.; and Wepfer, Robert M., 4,709,756, Cl. 165-162.000.
Zuber, Pierre A., 4,710,880, Cl. 364-426.000.

Weyerhaeuser Co.: *See*—
Miller, Ray R., 4,710,271, Cl. 162-360.100.
Selby, John S., 4,709,952, Cl. 294-82.140.

Whelen Engineering Co., Inc.: *See*—
Berke, Howard M.; and Lyons, Harold W., 4,710,749, Cl. 340-405.000.

Whirlpool Corporation: *See*—
Anselmino, Jeffrey; and Slabbekoorn, Scott D., 4,709,488, Cl. 34-235.000.
Hupfer, Ronald K., 4,709,556, Cl. 62-298.000.
Stacik, Harold S.; and Hafstrom, Warren R., 4,709,951, Cl. 292-189.000.

White, Charles M.; and Green, Wayne T., to General Electric Company. Preamplifier for an imaging system. 4,710,725, Cl. 330-51.000.

White, Geoffrey T., to InterNorth, Inc. Phase change heat exchanger. 4,709,750, Cl. 165-10.000.

Whiteley, Eric, to Maghemite Inc. Brushless D.C. dynamoelectric machine with decreased magnitude of pulsations of air gap flux. 4,710,667, Cl. 310-268.000.

Whiteley, Norman: *See*—
Bagnall, Paul J. H.; and Whiteley, Norman, 4,710,338, Cl. 264-509.000.

Whiteman, Robert N., Jr.: *See*—
Waters, Mark H.; and Whiteman, Robert N., Jr., 4,709,973, Cl. 439-78.000.

Widener, Wade H.: *See*—
Duncan, Robert; and Widener, Wade H., 4,709,909, Cl. 269-41.000.

Widmann, Karlheinz: *See*—
Bartholomaus, Reiner; and Widmann, Karlheinz, 4,709,619, Cl. 92-130.00D.

Wigell, Arthur H. Front loading continuous charger. 4,710,693, Cl. 320-2.000.

Wild, Peter: *See*—
Franke, Gunter; Ockelmann, Dieter; Raue, Roderich; and Wild, Peter, 4,710,569, Cl. 544-31.000.

Wildenradt, Carl H. Single cylinder deadbolt lock mechanism. 4,709,566, Cl. 70-129.000.

Wildt, Theodor N., to Minnesota Mining and Manufacturing Company. Anti-theft device for compact discs. 4,709,813, Cl. 206-312.000.

Wilger, Wilfed H. Variable height field sprayer frame. 4,709,857, Cl. 239-164.000.

Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, to C. Conradty Nurnberg GmbH & Co. Plasma burner with replaceable consumable electrodes. 4,710,607, Cl. 219-121.00P.

Wilkins, David R. G.; Brooker, Reginald D.; Walker, Roger; and Powell, Harry, to McCorquodale Machine Systems Limited. Printing wheel setting and aligning apparatus. 4,709,630, Cl. 101-93.220.

Wilkinson, Trevor A. Nut for stringed instruments. 4,709,612, Cl. 84-314.00N.

Willard, Alvin K.; Novello, Frederick C.; Hoffman, William F.; and Cragoe, Edward J., Jr., to Merck & Co., Inc. Substituted pyranone inhibitors of cholesterol synthesis. 4,710,513, Cl. 514-460.000.

Willcott, M. Robert: *See*—
Mee, Gary L.; and Willcott, M. Robert, 4,710,715, Cl. 324-307.000.

Williams, Arthur, to Commercial Shearing, Inc. Fluid valve structures. 4,709,724, Cl. 137-596.000.

Williams, Joseph R., II. Releasable snap connector. 4,709,975, Cl. 439-350.000.

Willingham, W. Preston. Circular game board foldable into small volume. 4,709,928, Cl. 273-309.000.

Willmann, Gerd: *See*—
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, 4,710,480, Cl. 501-95.000.

Wilson, Alan L.: *See*—
Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., 4,710,945, Cl. 375-100.000.
Bocci, Paul M.; Pietrzak, Carl M., Jr.; and Wilson, Alan L., 4,710,957, Cl. 380-42.000.

Wilson, Arthur M., to Texas Instruments Incorporated. Method for producing an integrated circuit product having a polyimide film interconnection structure. 4,709,468, Cl. 437-209.000.

Wilson, John C.: *See*—
Boland, Leona G.; Stevens, Robert A.; Wilson, John C.; and Zehner, Georgia L., 4,710,187, Cl. 604-385.00A.

Wilson, Richard A.; and Barbaglia, Joseph C., to Wright, Robert L. Adjustable batting tee. 4,709,924, Cl. 273-26.00R.

Wilson, Robert M.; and Wepfer, Robert M., to Westinghouse Electric Corp. Steam generator tube support. 4,709,756, Cl. 165-162.000.

Wilson, Woody W.; and Wadsworth, Nathaniel G., to Pitney Bowes Inc. Electronic postage meter having a status monitor. 4,710,883, Cl. 364-466.000.

Wimberley, J. W.: *See*—
Allison, Joe D.; and Wimberley, J. W., 4,710,305, Cl. 210-747.000.

Winch, Kenneth H.: *See*—
Newman, Geoffrey C. S.; Pilkington, Andrew L.; and Winch, Kenneth H., 4,710,129, Cl. 434-55.000.

Wing Aero: *See*—
Hembree, Charles B.; and Shea, Brian T., 4,709,483, Cl. 33-18.100.

Winkelmann, Manfred; Muschner, Udo; and Gerber, Pierre, to Didier-Werke AG. Casing assembly for injecting material into a metallurgical vessel. 4,709,905, Cl. 266-270.000.

Winkler & Dunnebier Maschinenfabrik und Eisengiesserei GmbH & Co. KG: *See*—
Stemmler, Kurt, 4,709,606, Cl. 83-94.000.

Wirth, Ludwig: *See*—
Buschmann, Rudiger; Ganz, Rudolf; Willmann, Gerd; Wirth, Ludwig; Elstner, Ingo; and Jeschke, Peter, 4,710,480, Cl. 501-95.000.

Wissmann, Michael; Weber, Jurgen; and Nickel, Hans, to Andreas Stihl. Ignition arrangement for an internal combustion engine of a handheld portable tool. 4,709,669, Cl. 123-149.00D.

Withjack, Eric M., to Atlantic Richfield Company. Geologic core holder with composite barrel. 4,710,948, Cl. 378-208.000.

Witter, David E.; and Bawa, Mohendra S., to Texas Instruments Incorporated. Deposition of silicon at temperatures above its melting point. 4,710,260, Cl. 156-605.000.

Wittler, Hilmar: *See*—
Lengsfeld, Karl; Link, Erich; Martin, Adolf; and Wittler, Hilmar, 4,709,794, Cl. 192-18.00B.

Woestman, John W., to RCA Corporation. Circuit for controlling the ink level of an intaglio printing device. 4,709,633, Cl. 101-163.000.

Wogoman, Frank W., to Miles Laboratories, Inc. Automated handling system. 4,710,351, Cl. 422-50.000.

Wolf, David L.: *See*—
Olsen, Peter C., Jr.; Conforto, Peter M.; Craighead, Jimmy R.; and Wolf, David L., 4,709,538, Cl. 53-566.000.

Wolf, Johann, to Johann Wolf Gesellschaft m.b.H. KG. Nailing plate for the production of compound supports, and compound support. 4,710,083, Cl. 411-466.000.

Wolfe, James R., Jr., to Du Pont de Nemours, E. I., and Company. Thermoplastic composition of polyolefin and high ethylene content ethylene/alkyl acrylate elastomer. 4,710,544, Cl. 525-194.000.

Wolfe, Mark E.: *See*—
Young, William M.; and Wolfe, Mark E., 4,710,395, Cl. 427-8.000.

Wolfer, Allan J.: *See*—
Bergstrom, Donald J.; and Wolfer, Allan J., 4,710,691, Cl. 318-696.000.

Wollar, Burnell, to Phillips Plastics Corporation. Tool for installing expandable fastener. 4,709,841, Cl. 227-55.000.

Wolski, Frank. Method for mounting shrimp. 4,709,498, Cl. 43-4.000.

Womack, Robert E.: *See*—
Flora, John H.; Womack, Robert E.; Stinnett, Carlton E.; and Dalton, Claude W., 4,710,710, Cl. 324-220.000.

Wong, Jeffrey T., to Fisons plc. Hemoglobin inositol phosphate compounds. 4,710,488, Cl. 514-6.000.

Wong, Mon N. Apparatus for the retention of fluid flowing from a container. 4,709,826, Cl. 220-1.00C.

Wong, Morton M.; and Shugarman, Arnold L., to Union Oil Co. of California; Mono Power Co.; and Southern Pacific Land Co. Process for reducing the concentration of heavy metals in geothermal brine sludge. 4,710,367, Cl. 423-335.000.

Wong, Rosie B.: *See*—
Schenkel, Robert H.; Wong, Rosie B.; and Thammana, Pallaiah, 4,710,377, Cl. 424-88.000.

Wong, Wai C., to Eastman Kodak Company. Shutter release and film advance interlock mechanism. 4,710,006, Cl. 354-204.000.

Wong, Wai C., to W. Haking Enterprises Limited. Automatic focusing mechanism for camera. 4,710,013, Cl. 354-419.000.

Wood, Charles H., to Fusion Systems Corporation. Apparatus for treating coatings. 4,710,638, Cl. 250-492.100.

Wood, Leigh E.; Miller, John A.; and Sipinen, Alan J., to Minnesota Mining and Manufacturing Company. Diaper having improved reinforced area for receiving adhesive fastening tape. 4,710,190, Cl. 604-389.000.

Wood, Louis L.; and Carlton, Gary J., to Purification Engineering, Inc. Process for preparing phenylalanine. 4,710,467, Cl. 435-108.000.

Wooley, Paul H., to American Home Products Corporation (Del.). Etodolac for inhibition of joint ankylosis. 4,710,511, Cl. 514-411.000.

Wright, George B.: *See*—
Yoder, Max N.; and Wright, George B., 4,710,478, Cl. 437-40.000.

Wright, Robert L.: *See*—
Wilson, Richard A.; and Barbaglia, Joseph C., 4,709,924, Cl. 273-26.00R.

Wright, William B., Jr.; and Tomcufcik, Andrew S., to American Cyanamid Company. 3-heteroarylalkyl-4-quinazolinones. 4,710,502, Cl. 514-259.000.

Wu, Joseph C.; Law, Yee-Shing; and James, John, to TFT, Inc. Method of and apparatus for generating a frequency modulated ultrahigh frequency radio transmission signal. 4,710,970, Cl. 455-113.000.

Wurttembergische Parfumerie-Fabrik GmbH: *See*—
Scheller, Hans-Ulrich, 4,710,372, Cl. 424-49.000.

Wyatt, Philip J.; and Quist, Gregory M., to Wyatt Technology Company. Process for characterizing suspensions of small particles. 4,710,025, Cl. 356-343.000.

Wyatt Technology Company: *See*—
Wyatt, Philip J.; and Quist, Gregory M., 4,710,025, Cl. 356-343.000.

Wynn Oil Company: *See*—
Vataru, Marcel, 4,709,822, Cl. 215-216.000.

Yabumoto, Seiichi, to Nippon Kogaku K. K. Picture signal generating apparatus. 4,710,816, Cl. 358-213.150.

Yagi, Shizuo; Kawai, Makoto; and Yamamoto, Yorihisa, to Honda Giken Kogyo Kabushiki Kaisha. Uncertainty detector in feed-back control system based on combustion peak position data for internal combustion engine and ignition timing control having particular detector. 4,709,678, Cl. 123-425.000.

Yakmovitz, Kenneth J., to RCA Corporation. Electron tube pin-sensing and straightening device. 4,709,733, Cl. 140-147.000.

Yale University: *See*—
Kozarich, John W.; and Rhoads, Robert E., 4,710,566, Cl. 536-28.000.
Lin, Tai-Shun; and Prusoff, William H., 4,710,492, Cl. 514-50.000.
Weissman, Sherman M.; and Collins, Francis, 4,710,465, Cl. 435-91.000.

Yamada, Fumiya; Matsuki, Seiichiro; Kawamura, Masahiko; and Kawamoto, Masashi, to Pioneer Electronic Corporation. Magnetic head driving mechanism for tape player. 4,710,835, Cl. 360-106.000.

Yamada, Kimitoshi, to Hitachi, Ltd. Display screen control system. 4,710,762, Cl. 340-721.000.

Yamada, Masanori, to Canon Kabushiki Kaisha. Flash photography system. 4,710,012, Cl. 354-415.000.

Yamada, Minoru; Wajima, Motoyo; Masaki, Akira; Takahashi, Akio; Nakanishi, Keiichirou; and Sugawara, Katuo, to Hitachi, Ltd. Hybrid multilayer wiring board. 4,710,854, Cl. 361-414.000.

Yamada, Noboru; Nagashima, Michiyoshi; and Nishiuchi, Kenichi, to Matsushita Electric Industrial Co., Ltd. Method for recording, reproducing and erasing optical information. 4,710,911, Cl. 369-100.000.

Yamada, Satoshi; and Furukawa, Kaoru, to Matsushita Electric Works, Ltd. Power supply circuit. 4,710,695, Cl. 320-21.000.

Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Maehara, Yasuhiro; and Yasumoto, Kunio, to Sumitomo Metal Industries, Ltd. Method of processing continuously cast slabs. 4,709,572, Cl. 72-366.000.

Yamagishi, Wataru; and Sagawa, Masato, to Fujitsu Limited. Material for temperature sensitive elements. 4,710,242, Cl. 148-301.000.

Yamaguchi, Fumio: *See*—
Yamanaka, Toshio; and Yamaguchi, Fumio, 4,710,479, Cl. 501-15.000.

Yamaguchi, Naoko: *See*—
Saito, Junichi; Tamura, Tatsuo; Kurahashi, Yoshio; Uzawa, Shigeru; Matsumoto, Noboru; and Yamaguchi, Naoko, 4,710,509, Cl. 514-384.000.

Yamaguchi, Youko; Shimizu, Hiroshi; Tsuda, Ichiro; Yano, Masafumi; and Okumura, Tokiko, to Research Development Corporation of Japan. Pattern recognition apparatus using oscillating memory circuits. 4,710,964, Cl. 382-17.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Fujita, Minoru, 4,709,675, Cl. 123-376.000.

Yamakami, Osamu: *See*—
Hayashi, Toshihide; Yamakami, Osamu; and Kanayama, Ikuo, 4,710,972, Cl. 455-179.000.

Yamamoto, Kunihiko: *See*—
Takeda, Makoto; Nonomura, Keisaku; and Yamamoto, Kunihiko, 4,710,768, Cl. 340-805.000.

Yamamoto, Masahiko: *See*—
Nishino, Yoshinori; Yamamoto, Masahiko; Uda, Tadayoshi; Kondo, Kiyoshi; Kondo, Yutaka; and Kondo, Kazuo, 4,709,714, Cl. 134-89.000.

Yamamoto, Shoji: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Yamamoto, Tadashi, to Sony Corporation. Automatic telephone answering apparatus with recorded cue signals separating each incoming message. 4,710,950, Cl. 379-70.000.

Yamamoto, Yorihisa: *See*—
Yagi, Shizuo; Kawai, Makoto; and Yamamoto, Yorihisa, 4,709,678, Cl. 123-425.000.

Yamamura, Hideho: *See*—
Saitoh, Takashi; Niizaki, Nobuya; Yamamura, Hideho; and Hayashi, Shinichi, 4,710,654, Cl. 307-601.000.

Yamamura, Keiji: *See*—
Nakatani, Hiroshi; Yoshida, Hirokazu; and Yamamura, Keiji, 4,710,680, Cl. 315-169.400.

Yamanaka, Kazuo: *See*—
Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, 4,710,237, Cl. 148-13.000.

Yamanaka, Megumi: *See*—
Takeuchi, Koichi; Yamanaka, Megumi; Kubo, Masayoshi; Katayama, Hideaki; and Tokunaga, Kenji, 4,710,255, Cl. 156-361.000.

Yamanaka, Toshio; and Yamaguchi, Fumio, to Nippon Electric Glass Company, Limited. Sealing glass composition with lead calcium titanate filler. 4,710,479, Cl. 501-15.000.

Yamanashi, Takanori, to Olympus Optical Co., Ltd. Telephoto lens system. 4,709,998, Cl. 350-454.000.

Yamane, Hiroto: *See*—
Uetsuki, Haruo; Kobayashi, Takehiro; and Yamane, Hiroto, 4,710,689, Cl. 318-630.000.

Yamano, Shoji; and Miyamoto, Isao, to Yamato Scale Company, Limited. Combination weighing method. 4,709,769, Cl. 177-1.000.

Yamashita, Akiya: *See*—
Kasai, Tatsushi; Niikura, Tatsuo; Sato, Masanori; Hashimoto, Takao; and Yamashita, Akiya, 4,710,215, Cl. 62-532.000.

Yamato Scale Company, Limited: *See*—
Kohashi, Toru; and Adachi, Motoyuki, 4,709,770, Cl. 177-50.000.
Yamano, Shoji; and Miyamoto, Isao, 4,709,769, Cl. 177-1.000.

Yamauchi, Yasuhisa; Asano, Masao; Anzai, Hideyuki; and Yasufuku, Yoshitaka, to Konishiroku Photo Industry Co., Ltd. Process for treating magnetic metal power. 4,710,427, Cl. 428-407.000.

Yamazaki, Shinsuke; Takeda, Rikio; and Uda, Iwao, to Sumitomo Metal & Mining Co., Ltd. Highly conductive copper-based alloy. 4,710,349, Cl. 420-495.000.

Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Photoelectric conversion device and its manufacturing method. 4,710,397, Cl. 427-53.100.

Yanagisawa, Keizo: *See*—
Boda, Keiji; Waki, Kouichirou; and Yanagisawa, Keizo, 4,709,596, Cl. 74-868.000.

Yang, Tai-her. Mock bicycle for exercise and training effects. 4,709,917, Cl. 272-73.000.

Yankovsky, Kharri I.: *See*—
Voll, Martin A.; Eiskop, Robert K.; and Yankovsky, Kharri I., 4,709,584, Cl. 73-864.440.

Yano, Masafumi: *See*—
Yamaguchi, Youko; Shimizu, Hiroshi; Tsuda, Ichiro; Yano, Masafumi; and Okumura, Tokiko, 4,710,964, Cl. 382-17.000.

Yasuda, Hirohiko: *See*—
Hirano, Masao; Kato, Mitsutaka; Yasuda, Hirohiko; and Hinoda, Seisuke, 4,710,033, Cl. 374-161.000.

Yasue, Hideki; and Fukumura, Kagenori, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control system in an automatic transmission for a vehicle. 4,709,597, Cl. 74-868.000.

Yasufuku, Yoshitaka: *See*—
Yamauchi, Yasuhisa; Asano, Masao; Anzai, Hideyuki; and Yasufuku, Yoshitaka, 4,710,427, Cl. 428-407.000.

Yasumiishi, Calvin K. Visual tip. 4,709,500, Cl. 43-24.000.

Yasumoto, Kunio: *See*—
Yamada, Tsuneo; Sakashita, Tsutomu; Tomono, Hiroshi; Kimura, Takashi; Maehara, Yasuhiro; and Yasumoto, Kunio, 4,709,572, Cl. 72-366.000.

Yasunobu, Kojima: *See*—
Nobuo, Kawahigashi; Shigesou, Hashida; and Yasunobu, Kojima, 4,710,331, Cl. 264-41.000.

Yatagai, Shigeo: *See*—
Banno, Haruhiko; and Yatagai, Shigeo, 4,710,771, Cl. 340-811.000.

Yates, David E.; and Dack, Stuart W., to ICI Australia Limited. Emulsion explosive composition. 4,710,248, Cl. 149-21.000.

Yee, Seening, to Grumman Aerospace Corporation. Edge detector circuit and oscillator using same. 4,710,653, Cl. 307-518.000.

Ying-Chung, Chen. Single-axis control automatic faucet. 4,709,728, Cl. 137-636.400.

Yoder, Max N.; and Wright, George B., to United States of America, Navy. Method for making germanium/gallium arsenide high mobility complementary logic transistors. 4,710,478, Cl. 437-40.000.

Yokoyama, Yutaka: *See*—
Shinozaki, Fumihiko; and Yokoyama, Yutaka, 4,710,310, Cl. 252-62.200.

Yoneda, Takao; Ogasawara, Tadashi; Ohta, Norio; and Sakakibara, Yasuji, to Toyoda Koki Kabushiki Kaisha. Numerically controlled grinding machine. 4,709,509, Cl. 51-165.710.

Yonezawa, Seiji: *See*—
Tsuyoshi, Toshiaki; Yonezawa, Seiji; Kasai, Masuo; and Uno, Motoo, 4,710,909, Cl. 369-46.000.

Yonezawa, Toshio; Sasaguri, Nobuya; Onimura, Kichiro; Susukida, Hiroshi; Kawaguchi, Katsuji; Nagano, Hiroo; Minami, Takao; Yamanaka, Kazuo; Okada, Yasutaka; and Inoue, Mamoru, to Mitsubishi Jukogyo Kabushiki Kaisha; and Sumitomo Metal Industries, Ltd. Method for thermal treatment of nickel based alloy materials. 4,710,237, Cl. 148-13.000.

Yoshida, Hiroaki: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Yoshida, Hirokazu: *See*—
Nakatani, Hiroshi; Yoshida, Hirokazu; and Yamamura, Keiji, 4,710,680, Cl. 315-169.400.

Yoshida, Hiroshi; Toyoshima, Takefumi; Iwabori, Tomio; Ohkura, Hideaki; Miyamoto, Yasuo; Nishimura, Izumi; Oikawa, Toshiyuki; Sekijima, Kenji; and Ohashi, Makoto, to Hokushin Kogyo Kabushiki Kaisha. Fluid-sealed engine mounting. 4,709,898, Cl. 248-562.000.

Yoshida Kogyo K. K.: *See*—
Matsuda, Yoshio, 4,709,562, Cl. 66-193.000.

Yoshihara, Satoshi: *See*—
Takano, Katsuhiko; Yoshihara, Satoshi; Iijima, Shigeharu; Sasamori, Eizo; Matsushima, Masaaki; and Kishi, Hiroyoshi, 4,710,418, Cl. 428-192.000.

Yoshimura, Toshiteru; Kobayashi, Takayuki; and Ono, Masayoshi, to Mazda Motor Corporation. Knee protector structure for vehicle. 4,709,943, Cl. 280-751.000.

Yoshioka, Kouichi: *See*—
Imai, Hiroshi; and Yoshioka, Kouichi, 4,710,830, Cl. 360-97.000.

Yoshizawa, Ken: *See*—
Matsushima, Seiichi; Higashihara, Toshio; Shimizu, Mitsuru; Yoshizawa, Ken; Suzuki, Masahiro; and Sugiyama, Toshinori, 4,710,913, Cl. 369-280.000.

Young, Ian, to Intel Corporation. Substrate bias generator including multivibrator having frequency independent of supply voltage. 4,710,647, Cl. 307-297.000.

Young, Kenneth P.; Tyler, Derek E.; Cheskis, Harvey P.; and Watson, W. Gary, to Alumax, Inc. Process and apparatus for continuous slurry casting. 4,709,746, Cl. 164-485.000.

Young, Rosa; and Ovshinsky, Stanford R., to Energy Conversion Devices, Inc. Data storage medium incorporating a transition metal for increased switching speed. 4,710,899, Cl. 365-113.000.

Young, Steven D.: *See*—
Baldwin, John J.; Huff, Joel R.; Vacca, Joseph P.; Young, Steven D.; deSolms, Jane; and Guare, James P., Jr., 4,710,504, Cl. 514-267.000.

Young, William M.; and Wolfe, Mark E., to Delco Electronics Corporation. Method and apparatus for through hole substrate printing. 4,710,395, Cl. 427-8.000.

Yu, Ho; and Granger, Douglas A., to Aluminum Company of America. Process and apparatus for reducing macrosegregation adjacent to a longitudinal centerline of a solidified body. 4,709,747, Cl. 164-487.000.

Yu, Ho: *See*—
Jacoby, John E.; Yu, Ho; and Ramser, Robert A., 4,709,740, Cl. 164-5.000.

Yuasa, Hiroo: *See*—
Takizawa, Shozo; Kobayashi, Kazuyoshi; Fukuyama, Kazuo; Tani, Masanori; Yamamoto, Shoji; Yuasa, Hiroo; Nishimori, Masayoshi; Yoshida, Hiroaki; Eto, Shinichi; Hirao, Eiji; and Goto, Masaki, 4,709,935, Cl. 280-91.000.

Yugami, Yoshinori: *See*—
Kajioka, Yasuo; Komine, Tomio; Kadowaki, Hitoshi; Matsuda, Shigeyoshi; Yugami, Yoshinori; Kubota, Shinya; Takahashi, Yoshio; Shimada, Hiroshi; and Kurata, Nobutaka, 4,709,899, Cl. 249-20.000.

Zabel, Robert. Septic tank filters. 4,710,295, Cl. 210-336.000.

Zahn, Klaus: *See*—
Obel, Werner; and Zahn, Klaus, 4,709,941, Cl. 280-461.00A.

Zahnradfabrik Friedrichshafen, Ag.: *See*—
Merz, Johann, 4,709,666, Cl. 123-41.120.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Umezawa, Hamao; Suzuki, Shintaro; Ohkuma, Taka'aki; Sato, Fumihiro; and Nakamura, Teruya, 4,710,517, Cl. 514-616.000.

Zasuwa, Gerard A.: *See*—
Levin, Nathan W.; and Zasuwa, Gerard A., 4,710,164, Cl. 604-66.000.

Zax, David B.: *See*—
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, 4,710,714, Cl. 324-307.000.

Zehner, Georgia L.: *See*—
Boland, Leona G.; Stevens, Robert A.; Wilson, John C.; and Zehner, Georgia L., 4,710,187, Cl. 604-385.00A.

Zelezniak, Joseph J.: *See*—
Soroka, Daniel P.; Swensrud, Roger L.; and Zelezniak, Joseph J., 4,710,606, Cl. 219-121.0LU.

Zeleznik, Mark R.: *See*—
Stanley, Thomas R.; and Zeleznik, Mark R., 4,709,450, Cl. 17-49.000.

Zell, Karl: *See*—
Glomb, Kurt; Niggl, Heinz; Pelzl, Leo; and Zell, Karl, 4,710,132, Cl. 439-79.000.

Zenith Electronics Corporation: *See*—
Adamski, Alfred; DeFranco, Thomas P.; and Dougherty, Lawrence W., 4,710,669, Cl. 313-402.000.
Dougherty, Lawrence W.; and Fendley, James R., 4,710,670, Cl. 313-407.000.
Fitzgibbon, James, 4,710,759, Cl. 340-712.000.
Knowles, Terence J.; Ray, Francis M.; and Shewey, Charles E., 4,710,707, Cl. 324-158.00F.
Perdue, Terry A.; and Cubbage, William, 4,710,137, Cl. 439-457.000.
Roberts, William N., 4,710,820, Cl. 358-231.000.

Ziebig, Anton; Brigasky, Hans; and Lewand, Willi, to Hoechst Ceram-Tec Aktiengesellschaft. Extrusion device for the production of honeycomb structures. 4,710,123, Cl. 425-464.000.

Ziemer, Wolf; Neubert, Fritz; and Holle, Wilhelm, to Flakt AB. Suspendable modular frame arrangement for clean room ceilings having a fluid seal. 4,710,208, Cl. 55-355.000.

Ziggity Systems, Inc.: *See*—
Hostetler, Eldon, 4,709,658, Cl. 119-18.000.

Ziller, Josef, to Schenk Filterbau Gesellschaft mit beschrankter Haftung. Rotary disk filter element. 4,710,294, Cl. 210-232.000.

Zilm, Kurt W.: *See*—
Weitekamp, Daniel P.; Bielecki, Anthony; Zax, David B.; Zilm, Kurt W.; and Pines, Alexander, 4,710,714, Cl. 324-307.000.

Zimmer, Ernst; and Kikut, Botho, to KUKA Schweissanlagen & Roboter GmbH. Device for the automatic gripping and releasing of a tool holder in a manipulator. 4,710,093, Cl. 414-730.000.

Zimmerman, Patrick G.: *See*—
Klingen, Jurgen; and Zimmerman, Patrick G., 4,710,536, Cl. 524-493.000.

Zimmermann, William A.: *See*—
Kelly, John E.; Jones, Don C.; Tuck, Frederick R.; Zimmermann, William A.; and Clark, Kenneth R., 4,710,031, Cl. 356-440.000.

Zivkovich, Aleksandar. Process for burning a carbonaceous fuel using a high-energy alternating current wave. 4,710,681, Cl. 315-209.00T.

Zoladz, Frank J., to North American Philips Consumer Electronics Corp. Two-part transformer casting having liquid-tight seal. 4,709,828, Cl. 220-76.000.

Zollner, Dieter: *See*—
Wilhelmi, Herbert; Kegel, Kurt; Zollner, Dieter; Lauterbach-Dammler, Inge; Taube, Thomas; and Rittman, Friedrich, 4,710,607, Cl. 219-121.00P.

Zolnowsky, John; Crudele, Lester M.; and Spak, Michael E., to Motorola, Inc. Method and apparatus for validating prefetched instruction. 4,710,866, Cl. 364-200.000.

Zongker, Dwight E., to Cessna Aircraft Company, The. Series self-leveling valve with single spool for unloading and relief. 4,709,618, Cl. 91-31.000.

Zortman, Zedekiah Z., to American Device Manufacturing Co. Crash bar door locking device. 4,709,950, Cl. 292-92.000.

Zuber, Pierre A., to Westinghouse Electric Corp. Vehicle speed control apparatus and method. 4,710,880, Cl. 364-426.000.

Zuchtriegel, Anton, to Patent-Treuhand-Gesellschaft fur elektrische Gluhlampen m.b.H. Fluorescent lamp operating circuit. 4,710,682, Cl. 315-224.000.

Zur, Dov: *See*—
Shepler, John E.; and Zur, Dov, 4,710,840, Cl. 361-20.000.

Zwilling, Hermann, to Rehau AG & Co. Pipe cluster unit. 4,709,730, Cl. 138-111.000.

3M Holding Co. Ltd.: *See*—
Briltz, Raymond P., 4,710,290, Cl. 210-199.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 1ST DAY OF DECEMBER, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Brinly-Hardy Co., Inc.: *See*—
Doering, Charles W., Re. 32,551, Cl. 56-396.000.

Doering, Charles W., to Brinly-Hardy Co., Inc. Pushed dethatching unit. Re. 32,551, Cl. 56-396.000.

Lai, Stanley H.: *See*—
Liebermann, Leonard; and Lai, Stanley H., Re. 32,552, Cl. 340-632.000.

Liebermann, Leonard; and Lai, Stanley H. Gaseous impurity detector employing corona discharge phenomenon. Re. 32,552, Cl. 340-632.000.

LIST OF DESIGN PATENTEES

Adler, Herbert, to Crest Industries Corp. Desk caddy. 292,991, 12-1-87, Cl. D19-78.000.

American Safety Razor Company: *See*—
Iten, Clemens A.; and Chase, David O., 293,036, Cl. D28-48.000.

Andersson, Karl A.: *See*—
Ferm, Morgan; and Andersson, Karl A., 292,959, Cl. D7-103.000.

ASEA AB: *See*—
Skoog, Hans-Olov; Holmqvist, Ulf J.; and Tellden, Leif K., 292,981, Cl. D15-199.000.

AVIA Group International, Inc.: *See*—
Kelley, Brenda, 292,941, Cl. D2-314.000.
Kelley, Brenda, 292,944, Cl. D2-314.000.
Selbiger, Lawrence; and Ludeman, John, 292,942, Cl. D2-314.000.
Selbiger, Lawrence; and Ludeman, John, 292,945, Cl. D2-314.000.
Tong, James K., 292,943, Cl. D2-314.000.

Bates Manufacturing Company, The: *See*—
Leszczak, John, 292,962, Cl. D8-50.000.

Beattie, D. Stuart, to Fox Pool Corporation. Plastic sheet material for a pool liner. 293,039, 12-1-87, Cl. D5-61.000.

Bidwell, Christopher C.: *See*—
Knight, James L.; and Bidwell, Christopher C., 292,954, Cl. D6-409.000.

Black & Decker Inc.: *See*—
Zurwelle, Donald W., 293,027, Cl. D26-46.000.

Brandes, J. Henry: *See*—
Morgan, Annis R., Jr.; King, Eddie W.; Brandes, J. Henry; and Lettera, James N., 292,993, Cl. D20-5.000.

Bristol-Myers Company: *See*—
duCret, Doris, 293,034, Cl. D28-7.000.

Brussing, Bernd, to Hefendehl, Hans Friedrich. Magazine rack. 292,957, 12-1-87, Cl. D6-475.000.

Bunn-O-Matic Corporation: *See*—
Daugherty, Donald L., 292,961, Cl. D7-309.000.

Butcher, Richard H., to F. F. Seeley Nominees Pty Ltd. Front panel for an air conditioner. 293,022, 12-1-87, Cl. D23-354.000.

Cable Electric Products, Inc.: *See*—
Schwartz, Frederic W., 293,031, Cl. D26-118.000.

Canon Kabushiki Kaisha: *See*—
Kando, Masahiro, 292,976, Cl. D14-94.000.

Capawana, Ross. Conveyor cleat. 293,037, 12-1-87, Cl. D34-35.000.

Cave, Carol. Plant stand. 292,953, 12-1-87, Cl. D6-405.000.

Chase, David O.: *See*—
Iten, Clemens A.; and Chase, David O., 293,036, Cl. D28-48.000.

Chow, Marland, to Prometrix Corporation. Automatic semiconductor wafer tester. 292,979, 12-1-87, Cl. D10-75.000.

Citizen Watch Co., Ltd.: *See*—
Ikeda, Haruo, 292,977, Cl. D14-111.000.

Coca-Cola Company, The: *See*—
Morgan, Annis R., Jr.; King, Eddie W.; Brandes, J. Henry; and Lettera, James N., 292,993, Cl. D20-5.000.

Cordis Corporation: *See*—
Giurtino, Joel F., 293,023, Cl. D24-17.000.

Crest Industries Corp.: *See*—
Adler, Herbert, 292,991, Cl. D19-78.000.

Curran, Brian. Games sheet. 292,998, 12-1-87, Cl. D21-37.000.

Curran, Brian. Games sheet. 292,999, 12-1-87, Cl. D21-37.000.

CWA Constructions SA: *See*—
Frech, Anton; and Riser, Georg, 292,971, Cl. D12-37.000.

Darr, Richard C., to Plastipak Packaging, Inc. Liquid container. 292,968, 12-1-87, Cl. D9-370.000.

Daugherty, Donald L., to Bunn-O-Matic Corporation. Coffee brewer and hot water dispenser. 292,961, 12-1-87, Cl. D7-309.000.

Davis, Kathleen A. Insect light. 293,014, 12-1-87, Cl. D22-123.000.

DiPietro, David J. Taco shell. 292,940, 12-1-87, Cl. D1-122.000.

Dittig, Millie. Slant board or similar article. 293,007, 12-1-87, Cl. D21-191.000.

Donner Mountain Corporation, The: *See*—
Stubblefield, Jerry D.; and Selbiger, Lawrence, 292,946, Cl. D2-320.000.

duCret, Doris, to Bristol-Myers Company. Applicator container. 293,034, 12-1-87, Cl. D28-7.000.

Electrix, Inc.: *See*—
Shwisha, Haim, 293,026, Cl. D26-24.000.
Shwisha, Haim, 293,029, Cl. D26-60.000.

Eliasson, Erik, to Tage & Soner Byggnadsfirma AB. Label holder attachment for the back of a binder. 292,990, 12-1-87, Cl. D19-32.000.

Emms, Norman R., to Hestair Kiddicraft Limited. Child's toy. 293,004, 12-1-87, Cl. D21-158.000.

Estee Lauder Inc.: *See*—
Gager, James F., 292,966, Cl. D9-436.000.

F. F. Seeley Nominees Pty Ltd: *See*—
Butcher, Richard H., 293,022, Cl. D23-354.000.

Fein, Selwyn H. Container for cushions. 292,965, 12-1-87, Cl. D9-418.000.

Ferm, Morgan; and Andersson, Karl A., to Hammarplast AB. Whisk. 292,959, 12-1-87, Cl. D7-103.000.

Finkel Outdoor Products, Inc.: *See*—
Levy, Edward D., 292,947, Cl. D3-10.000.

Fisher, Dan F. Filter for dishwasher. 293,016, 12-1-87, Cl. D23-209.000.

Fortin, Laurent R. Ski coaster. 293,010, 12-1-87, Cl. D21-227.000.

Fox Pool Corporation: *See*—
Beattie, D. Stuart, 293,039, Cl. D5-61.000.

Frech, Anton; and Riser, Georg, to CWA Constructions SA. Monorail vehicle. 292,971, 12-1-87, Cl. D12-37.000.

Fry, Steven A.; and Stafford, Rodney L. Seat for a truck bed. 292,950, 12-1-87, Cl. D6-356.000.

Fuji Robin Kabushiki Kaisha: *See*—
Tomita, Hiroshi; and Hatano, Hiroaki, 292,980, Cl. D15-16.000.

Gager, James F., to Estee Lauder Inc. Combined bulb and cap for a dropper applicator. 292,966, 12-1-87, Cl. D9-436.000.

Gagnon, Paul L. Bottle cap. 292,967, 12-1-87, Cl. D9-439.000.

General Signal Corporation: *See*—
Hansen, Donald J.; and Read, Gary G., 292,978, Cl. D15-7.000.

Gibb, Olga B. Sign. 292,996, 12-1-87, Cl. D20-42.000.

Giurtino, Joel F., to Cordis Corporation. Cardiac pacer analyzer. 293,023, 12-1-87, Cl. D24-17.000.

Gordon, Steven J., to Melannco International Ltd. Photograph album cover. 292,989, 12-1-87, Cl. D19-26.000.

Greubel, Jurgen: *See*—
Steinel, Heinrich W.; and Greubel, Jurgen, 293,020, Cl. D23-332.000.

Hamilton, Leslie: *See*—
Holewinski, Robert D.; and Hamilton, Leslie, 293,024, Cl. D24-31.000.

Hammarplast AB: *See*—
Ferm, Morgan; and Andersson, Karl A., 292,959, Cl. D7-103.000.

Hanagata, Masaki, to Nippon Kogaku K. K. Spectacles. 292,985, 12-1-87, Cl. D16-102.000.

Hansen, Donald J.; and Read, Gary G., to General Signal Corporation. Horizontal variable speed turbine pump. 292,978, 12-1-87, Cl. D15-7.000.

Hatano, Hiroaki: *See*—
Tomita, Hiroshi; and Hatano, Hiroaki, 292,980, Cl. D15-16.000.

Hefendehl, Hans Friedrich: *See*—
Brussing, Bernd, 292,957, Cl. D6-475.000.

Hestair Kiddicraft Limited: *See*—
Emms, Norman R., 293,004, Cl. D21-158.000.

Hiranaka, Shinichi, to Toyoda Jidosha Kabushiki Kaisha. Rear combination lamp for an automobile. 293,032, 12-1-87, Cl. D26-120.000.

Hiranaka, Shinichi, to Toyoda Jidosha Kabushiki Kaisha. Clearance lamp for an automobile. 293,033, 12-1-87, Cl. D26-120.000.

Holewinski, Robert D.; and Hamilton, Leslie, to Johnson & Johnson Dental Products, Company. Compartmented packaging container for dental materials or the like. 293,024, 12-1-87, Cl. D24-31.000.
Holmqvist, Ulf J.: *See*—
Skoog, Hans-Olov; Holmqvist, Ulf J.; and Tellden, Leif K., 292,981, Cl. D15-199.000.
Holscher, Knud, to IFO Sanitar AB. Water-closet. 293,019, 12-1-87, Cl. D23-301.000.
IFO Sanitar AB: *See*—
Holscher, Knud, 293,019, Cl. D23-301.000.
Ikeda, Haruo, to Citizen Watch Co., Ltd. Printer. 292,977, 12-1-87, Cl. D14-111.000.
Inoue, Akifumi; and Takeda, Koshiro, to Nippon Gakki Seizo Kabushiki Kaisha. Control desk for use in controlling an industrial robot. 292,956, 12-1-87, Cl. D6-449.000.
Interdica S.A.: *See*—
Kanoui, Joseph, 292,983, Cl. D16-102.000.
Iten, Clemens A.; and Chase, David O., to American Safety Razor Company. Safety razor handle. 293,036, 12-1-87, Cl. D28-48.000.
Jagger, Vivienne D., to Little People Limited. Spoon. 292,960, 12-1-87, Cl. D7-137.000.
Janowitz, C. Michael. Collapsible watering can or similar article. 293,017, 12-1-87, Cl. D23-212.000.
Johnson, Frederick C., Jr. Electrical guitar. 292,987, 12-1-87, Cl. D17-18.000.
Johnson & Johnson Baby Products Company: *See*—
Williams, D. Michael; and Kelly, Lois E., 293,000, Cl. D21-65.000.
Johnson & Johnson Dental Products, Company: *See*—
Holewinski, Robert D.; and Hamilton, Leslie, 293,024, Cl. D24-31.000.
Kando, Masahiro, to Canon Kabushiki Kaisha. Facsimile. 292,976, 12-1-87, Cl. D14-94.000.
Kanoui, Joseph, to Interdica S.A. Spectacles. 292,983, 12-1-87, Cl. D16-102.000.
Karlin, Jill A. Typeface. 292,988, 12-1-87, Cl. D18-27.000.
Kaye, Ronald H.; and Lumbra, Robert H. Self-adjusting hasp. 292,964, 12-1-87, Cl. D8-344.000.
Kelley, Brenda, to AVIA Group International, Inc. Shoe upper. 292,941, 12-1-87, Cl. D2-314.000.
Kelley, Brenda, to AVIA Group International, Inc. Shoe upper. 292,944, 12-1-87, Cl. D2-314.000.
Kelly, Lois E.: *See*—
Williams, D. Michael; and Kelly, Lois E., 293,000, Cl. D21-65.000.
Kenning, James M.; McErlane, William K.; and Schuster, Barry R., to Square D Company. Cable tray. 292,974, 12-1-87, Cl. D13-40.000.
Kepiro, Joseph. Refuse receptacle. 293,038, 12-1-87, Cl. D34-7.000.
King, Eddie W.: *See*—
Morgan, Annis R., Jr.; King, Eddie W.; Brandes, J. Henry; and Lettera, James N., 292,993, Cl. D20-5.000.
Knight, James L.; and Bidwell, Christopher C. Carpet display stand. 292,954, 12-1-87, Cl. D6-409.000.
Knight, James L. Carpet display stand. 292,955, 12-1-87, Cl. D6-409.000.
Kobayashi, Fumiyuki, to NEC Corporation. Combined carrying case and battery pack for a cordless telephone set. 292,975, 12-1-87, Cl. D14-65.000.
Lamb, Thomas. Chair. 292,951, 12-1-87, Cl. D6-470.000.
Larkin, Mark E.; Szempruch, Walter T.; and Yeaton, Stephen C. Thrust bearing for wheel struts of model airplanes. 293,003, 12-1-87, Cl. D21-91.000.
LaRue, Marvel M.: *See*—
Likness, Dawn M.; and LaRue, Marvel M., 292,958, Cl. D6-522.000.
Lessel, Chris L. Wetbike water inlet manifold. 292,973, 12-1-87, Cl. D12-317.000.
Leszczak, John, to Bates Manufacturing Company, The. Stapler. 292,962, 12-1-87, Cl. D8-50.000.
Lettera, James N.: *See*—
Morgan, Annis R., Jr.; King, Eddie W.; Brandes, J. Henry; and Lettera, James N., 292,993, Cl. D20-5.000.
Levy, Edward D., to Finkel Outdoor Products, Inc. Umbrella gear housing. 292,947, 12-1-87, Cl. D3-10.000.
Likness, Dawn M.; and LaRue, Marvel M. Paper towel holder. 292,958, 12-1-87, Cl. D6-522.000.
Lindberg, Bengt L. Annunciator. 292,994, 12-1-87, Cl. D20-20.000.
Little People Limited: *See*—
Jagger, Vivienne D., 292,960, Cl. D7-137.000.
Love, Russell W. Baseball line-up board. 292,969, 12-1-87, Cl. D10-46.100.
Ludeman, John: *See*—
Selbiger, Lawrence; and Ludeman, John, 292,942, Cl. D2-314.000.
Selbiger, Lawrence; and Ludeman, John, 292,945, Cl. D2-314.000.
Lumbra, Robert H.: *See*—
Kaye, Ronald H.; and Lumbra, Robert H., 292,964, Cl. D8-344.000.
Magestro, Terry J. Canine spectacles. 292,986, 12-1-87, Cl. D16-107.000.
Manniso, James L.; and Voshell, Glenn R. Knife. 293,013, 12-1-87, Cl. D22-118.000.
Manufacturers Merchandising Corp.: *See*—
Noyce, John B., 293,025, Cl. D25-129.000.
McCartney, Lorne R. Garment dryer or similar article. 293,021, 12-1-87, Cl. D32-6.000.
McErlane, William K.: *See*—
Kenning, James M.; McErlane, William K.; and Schuster, Barry R., 292,974, Cl. D13-40.000.
Melannco International Ltd.: *See*—
Gordon, Steven J., 292,989, Cl. D19-26.000.
Mercurio, Thomas O. Bed. 292,952, 12-1-87, Cl. D6-388.000.
Monroe, Julie. Toy figure. 293,006, 12-1-87, Cl. D21-168.000.
Morgan, Annis R., Jr.; King, Eddie W.; Brandes, J. Henry; and Lettera, James N., to Coca-Cola Company, The. Island vending machine. 292,993, 12-1-87, Cl. D20-5.000.
Muller, Thomas. Octagonal ball court. 293,008, 12-1-87, Cl. D21-199.000.
Murtaugh, Bernard H. Hub removing tool. 292,963, 12-1-87, Cl. D8-51.000.
Nakatani, Koma, to Velbon International Corp. Pan head assembly. 292,982, 12-1-87, Cl. D16-46.000.
NEC Corporation: *See*—
Kobayashi, Fumiyuki, 292,975, Cl. D14-65.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Inoue, Akifumi; and Takeda, Koshiro, 292,956, Cl. D6-449.000.
Nippon Kogaku K. K.: *See*—
Hanagata, Masaki, 292,985, Cl. D16-102.000.
Nishio, Hideaki; and Tomura, Atsushi. Motorcycle tire. 292,972, 12-1-87, Cl. D12-136.000.
Noyce, John B., to Manufacturers Merchandising Corp. Baluster. 293,025, 12-1-87, Cl. D25-129.000.
Ohkawa, Hiroshi, to Tomy Kogyo Co., Inc. Toy vehicle. 293,002, 12-1-87, Cl. D21-87.000.
Osborne, Jennifer J. Combined multiple mascara dispenser and applicator. 293,035, 12-1-87, Cl. D28-7.000.
Parina, Emil. Denture brush. 292,948, 12-1-87, Cl. D4-104.000.
Peyton, Jeffrey L. Toy bird figure. 293,005, 12-1-87, Cl. D21-160.000.
Pieniniemi, Esa. Starting-block. 293,009, 12-1-87, Cl. D21-199.000.
Plastipak Packaging, Inc.: *See*—
Darr, Richard C., 292,968, Cl. D9-370.000.
Poolmaster, Inc.: *See*—
Storey, William R.; and Tager, Leon H., 293,012, Cl. D21-237.000.
Prometrix Corporation: *See*—
Chow, Marland, 292,979, Cl. D10-75.000.
Read, Gary G.: *See*—
Hansen, Donald J.; and Read, Gary G., 292,978, Cl. D15-7.000.
Riser, Georg: *See*—
Frech, Anton; and Riser, Georg, 292,971, Cl. D12-37.000.
Rudelick, John, to Universal-Rundle Corporation. Combined sink sprayer and support sleeve. 293,018, 12-1-87, Cl. D23-226.000.
Schuster, Barry R.: *See*—
Kenning, James M.; McErlane, William K.; and Schuster, Barry R., 292,974, Cl. D13-40.000.
Schwaebische Buerstenfabrik Hans Haug KG: *See*—
Vetter, Roland, 292,949, Cl. D4-116.000.
Schwartz, Frederic W., to Cable Electric Products, Inc. Diffuser for a nightlight. 293,031, 12-1-87, Cl. D26-118.000.
Selbiger, Lawrence; and Ludeman, John, to AVIA Group International, Inc. Shoe upper. 292,942, 12-1-87, Cl. D2-314.000.
Selbiger, Lawrence; and Ludeman, John, to AVIA Group International, Inc. Shoe upper. 292,945, 12-1-87, Cl. D2-314.000.
Selbiger, Lawrence: *See*—
Stubblefield, Jerry D.; and Selbiger, Lawrence, 292,946, Cl. D2-320.000.
Shearer, Hugh G. Fishing lure. 293,015, 12-1-87, Cl. D22-129.000.
Shwisha, Haim, to Electrix, Inc. Lamp. 293,026, 12-1-87, Cl. D26-24.000.
Shwisha, Haim, to Electrix, Inc. Portable reading lamp. 293,029, 12-1-87, Cl. D26-60.000.
Skoog, Hans-Olov; Holmqvist, Ulf J.; and Tellden, Leif K., to ASEA AB. Robot. 292,981, 12-1-87, Cl. D15-199.000.
Sonthonnax, Robert. Sun glasses. 292,984, 12-1-87, Cl. D16-102.000.
Square D Company: *See*—
Kenning, James M.; McErlane, William K.; and Schuster, Barry R., 292,974, Cl. D13-40.000.
Stafford, Rodney L.: *See*—
Fry, Steven A.; and Stafford, Rodney L., 292,950, Cl. D6-356.000.
Staley, Jack F. Desk set. 292,992, 12-1-87, Cl. D19-75.000.
Steinel GmbH & Co KG: *See*—
Steinel, Heinrich W.; and Greubel, Jurgen, 293,020, Cl. D23-332.000.
Steinel, Heinrich W.; and Greubel, Jurgen, to Steinel GmbH & Co KG. Hot air blower. 293,020, 12-1-87, Cl. D23-332.000.
Stewart, Ronald P. Coin tossing gameboard target. 292,997, 12-1-87, Cl. D21-5.000.
Storey, William R.; and Tager, Leon H., to Poolmaster, Inc. Pool lounger. 293,012, 12-1-87, Cl. D21-237.000.
Stubblefield, Jerry D.; and Selbiger, Lawrence, to Donner Mountain Corporation, The. Shoe sole. 292,946, 12-1-87, Cl. D2-320.000.
Suzuki, Tatsuya, to Tomy Kogyo Co., Inc. Toy vehicle. 293,001, 12-1-87, Cl. D21-87.000.
Szempruch, Walter T.: *See*—
Larkin, Mark E.; Szempruch, Walter T.; and Yeaton, Stephen C., 293,003, Cl. D21-91.000.
Tage & Soner Byggnadsfirma AB: *See*—
Eliasson, Erik, 292,990, Cl. D19-32.000.
Tager, Leon H.: *See*—
Storey, William R.; and Tager, Leon H., 293,012, Cl. D21-237.000.
Takeda, Koshiro: *See*—
Inoue, Akifumi; and Takeda, Koshiro, 292,956, Cl. D6-449.000.
Takezono, Masatsugu, to Teiemu Giken Kabushiki Kaisha. Amphibian bicycle. 292,970, 12-1-87, Cl. D12-3.000.
Teiemu Giken Kabushiki Kaisha: *See*—
Takezono, Masatsugu, 292,970, Cl. D12-3.000.

Tellden, Leif K.: *See*—
Skoog, Hans-Olov; Holmqvist, Ulf J.; and Tellden, Leif K., 292,981, Cl. D15-199.000.
Tomita, Hiroshi; and Hatano, Hiroaki, to Fuji Robin Kabushiki Kaisha. Bush cutter. 292,980, 12-1-87, Cl. D15-16.000.
Tomura, Atsushi: *See*—
Nishio, Hideaki; and Tomura, Atsushi, 292,972, Cl. D12-136.000.
Tomy Kogyo Co., Inc.: *See*—
Ohkawa, Hiroshi, 293,002, Cl. D21-87.000.
Suzuki, Tatsuya, 293,001, Cl. D21-87.000.
Tong, James K., to AVIA Group International, Inc. Shoe upper. 292,943, 12-1-87, Cl. D2-314.000.
Toyoda Jidosha Kabushiki Kaisha: *See*—
Hiranaka, Shinichi, 293,032, Cl. D26-120.000.
Hiranaka, Shinichi, 293,033, Cl. D26-120.000.
Tuckker, Douglas E.: *See*—
Yother, Lawrence E.; and Tuckker, Douglas E., 293,028, Cl. D26-51.000.
Universal-Rundle Corporation: *See*—
Rudelick, John, 293,018, Cl. D23-226.000.
Valento, Joseph P. Real estate sign system and carrier therefor. 292,995, 12-1-87, Cl. D20-10.000.
Velbon International Corp.: *See*—
Nakatani, Koma, 292,982, Cl. D16-46.000.
Vetter, Roland, to Schwaebische Buerstenfabrik Hans Haug K.G. Cleaning device for automobile windows. 292,949, 12-1-87, Cl. D4-116.000.
Vladescu, Stefan. Lamp or similar article. 293,030, 12-1-87, Cl. D26-107.000.
Voshell, Glenn R.: *See*—
Manniso, James L.; and Voshell, Glenn R., 293,013, Cl. D22-118.000.
Williams, D. Michael; and Kelly, Lois E., to Johnson & Johnson Baby Products Company. Rattle bird toy. 293,000, 12-1-87, Cl. D21-65.000.
Wolfe, Henry S. Tiger float. 293,011, 12-1-87, Cl. D21-237.000.
Yeaton, Stephen C.: *See*—
Larkin, Mark E.; Szempruch, Walter T.; and Yeaton, Stephen C., 293,003, Cl. D21-91.000.
Yother, Lawrence E.; and Tuckker, Douglas E. Combination night light and bank. 293,028, 12-1-87, Cl. D26-51.000.
Zurwelle, Donald W., to Black & Decker Inc. Flashlight. 293,027, 12-1-87, Cl. D26-46.000.

LIST OF PLANT PATENTEES

Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant named Kardo. 6,050, 12-1-87, Cl. 74.000.
Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant named Calvex. 6,051, 12-1-87, Cl. 79.000.
Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant named Zilcon. 6,052, 12-1-87, Cl. 80.000.
Klemm & Sohn: *See*—
Nobbio, Giacomo, 6,049, Cl. 72.000.
Nieuwoudt, Hermias C. Variety of navel orange tree. 6,047, 12-1-87, Cl. 45.000.
Nobbio, Giacomo, to Klemm & Sohn. Carnation named "Elinor". 6,049, 12-1-87, Cl. 72.000.
Van Staaveren B.V.: *See*—
van Andel, Jacob, 6,048, Cl. 68.000.
van Andel, Jacob, to Van Staaveren B.V. Alstroemeria named Stalsam. 6,048, 12-1-87, Cl. 68.000.
Yoder Brothers, Inc.: *See*—
Duffett, William E., 6,050, Cl. 74.000.
Duffett, William E., 6,051, Cl. 79.000.
Duffett, William E., 6,052, Cl. 80.000.

LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE 1ST DAY OF DECEMBER, 1987

Alexander, Harry B., Jr., to Du Pont de Nemours, E. I., and Company. Strain relief and ground connector for shielded cable. H379, 12-1-87, Cl. 439-610.000.
Bol, Gerard M., to Shell Oil Company. Shale coagulating low solids drilling fluid. H385, 12-1-87, Cl. 252-8.510.
Bremer, James C., to United States of America, Army. Degradation monitor for laser optics. H376, 12-1-87, Cl. 356-239.000.
Burt, Carolyn S., to United States of America, Army. Television test signal generator. H393, 12-1-87, Cl. 358-139.000.
Cadena, Edward R.: *See*—
Kruka, Vitold R.; and Cadena, Edward R., H387, Cl. 367-154.000.
Cleaton, Neil J., to United States of America, Navy. Flexible coupling device with electrical bonding for metallic ducts. H394, 12-1-87, Cl. 361-215.000.
Danielson, Arnold O.: *See*—
Dillinger, Robert B.; and Danielson, Arnold O., H384, Cl. 60-230.000.
Dillinger, Robert B.; and Danielson, Arnold O., to United States of America, Navy. Stowable three-axis reaction-steering system. H384, 12-1-87, Cl. 60-230.000.
Du Pont de Nemours, E. I., and Company: *See*—
Alexander, Harry B., Jr., H379, Cl. 439-610.000.
Levitt, George, H386, Cl. 71-92.000.
Greig, Walter G., to Moore Business Forms, Inc. Releaseable adhesive pads. H377, 12-1-87, Cl. 281-2.000.
Henriquez, Theodore A.; and Tims, Allan C., to United States of America, Navy. Piezoelectric polymer hydrophone. H391, 12-1-87, Cl. 367-159.000.
Jones, Peter N.: *See*—
Keown, William P.; and Jones, Peter N., H382, Cl. 102-517.000.
Keown, William P.; and Jones, Peter N., to United States of America, Army. Long rod penetrator. H382, 12-1-87, Cl. 102-517.000.
Kioritz Corporation: *See*—
Matsumoto, Isao, H378, Cl. 30-382.000.
Yokocho, Yoetsu, H380, Cl. 30-276.000.
Kruka, Vitold R.; and Cadena, Edward R., to Shell Oil Company. Wavelength filter for marine seismic cables. H387, 12-1-87, Cl. 367-154.000.
Lee, Robert E.; and Levy, Harold M., to United States of America, Air Force. Self-aligned gate MESFET and the method of fabricating same. H390, 12-1-87, Cl. 357-22.000.
Levitt, George, to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. H386, 12-1-87, Cl. 71-92.000.
Levy, Harold M.: *See*—
Lee, Robert E.; and Levy, Harold M., H390, Cl. 357-22.000.
Lloyd, Joseph P., to Shell Oil Company. Apparatus and method for locating towed seismic floats. H388, 12-1-87, Cl. 367-19.000.
Matsumoto, Isao, to Kioritz Corporation. Spiked bumper. H378, 12-1-87, Cl. 30-382.000.
Moon, Lamar F., to United States of America, Air Force. Fluid refraction optical path phase correction. H389, 12-1-87, Cl. 372-58.000.
Moore Business Forms, Inc.: *See*—
Greig, Walter G., H377, Cl. 281-2.000.
Nash, Thomas F., to United States of America, Army. Process for measuring the electrical properties of liquids and granular substances. H395, 12-1-87, Cl. 324-58.50B.
Pounds, Stanley G.; and Ramer, Daniel, to United States of America, Army. Condition monitoring device. H381, 12-1-87, Cl. 374-142.000.
Ramer, Daniel: *See*—
Pounds, Stanley G.; and Ramer, Daniel, H381, Cl. 374-142.000.
Shell Oil Company: *See*—
Bol, Gerard M., H385, Cl. 252-8.510.
Kruka, Vitold R.; and Cadena, Edward R., H387, Cl. 367-154.000.
Lloyd, Joseph P., H388, Cl. 367-19.000.
Skaritka, John R., to United States of America, Energy. Laminated magnet field coil sheath. H383, 12-1-87, Cl. 29-599.000.
Staehlin, John H., to United States of America, Air Force. Microwave waveguide manifold and method. H392, 12-1-87, Cl. 333-114.000.
Tims, Allan C.: *See*—
Henriquez, Theodore A.; and Tims, Allan C., H391, Cl. 367-159.000.
United States of America
Air Force: *See*—
Lee, Robert E.; and Levy, Harold M., H390, Cl. 357-22.000.
Moon, Lamar F., H389, Cl. 372-58.000.
Staehlin, John H., H392, Cl. 333-114.000.
Army: *See*—
Bremer, James C., H376, Cl. 356-239.000.
Burt, Carolyn S., H393, Cl. 358-139.000.
Keown, William P.; and Jones, Peter N., H382, Cl. 102-517.000.
Nash, Thomas F., H395, Cl. 324-58.50B.
Pounds, Stanley G.; and Ramer, Daniel, H381, Cl. 374-142.000.
Energy: *See*—
Skaritka, John R., H383, Cl. 29-599.000.
Navy: *See*—
Cleaton, Neil J., H394, Cl. 361-215.000.
Dillinger, Robert B.; and Danielson, Arnold O., H384, Cl. 60-230.000.
Henriquez, Theodore A.; and Tims, Allan C., H391, Cl. 367-159.000.
Yokocho, Yoetsu, to Kioritz Corporation. Trimmer. H380, 12-1-87, Cl. 30-276.000.

CLASSIFICATION OF PATENTS

ISSUED DECEMBER 1, 1987

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

46 4,709,419
50 4,709,420
81 4,709,421
180 4,709,422

CLASS 4

228 4,709,423
4,709,424
4,709,425
300.3 4,709,426
427 4,709,427
605 4,709,428
661 4,709,429

CLASS 5

417 4,709,430
481 4,709,431

CLASS 7

100 4,709,432

CLASS 8

437 4,710,198
507 4,710,199
574 4,710,200

CLASS 12

12.5 4,709,433
77 4,709,434

CLASS 14

73 4,709,435

CLASS 15

79 R 4,709,436
97 R 4,709,437
167 A 4,709,438
230.16 4,709,439
257.3 4,709,440
301 4,709,441
320 4,709,442
339 4,709,443

CLASS 16

31 A 4,709,444
300 4,709,445

CLASS 17

1 F 4,709,447
1 R 4,709,446
11 4,709,448
32 4,709,449
49 4,709,450

CLASS 19

105 4,709,451
159 R 4,709,452

CLASS 24

442 4,709,453
590 4,709,454

CLASS 29

40 4,709,455
155 R 4,709,456
156.8 R 4,709,457
243.5 4,709,458
263 4,709,459
271 4,709,460
434 4,709,462
526.3 4,709,461
566.3 4,709,463
568 4,709,464
4,709,465
605 4,709,470
4,709,471
623 4,709,472
749 4,709,473
802 4,709,474

CLASS 30

31 4,709,475
41 4,709,476
50 4,709,477
169 4,709,478
170 4,709,479
254 4,709,480
356 4,709,481

CLASS 33

1 M 4,709,482
18.1 4,709,483
169 R 4,709,484
228 4,709,485
304 4,709,486

CLASS 34

10 4,709,487
235 4,709,488

CLASS 36

27 4,709,489
44 4,709,490
121 4,709,491

CLASS 37

232 4,709,492

CLASS 40

117 4,709,493
152 4,709,494
158 R 4,709,495

CLASS 42

70.11 4,709,496
75.02 4,709,497

CLASS 43

4 4,709,498
17.6 4,709,499
24 4,709,500
42.24 4,709,501
112 4,709,502
114 4,709,503
4,709,504

CLASS 44

63 4,710,201

CLASS 47

1.7 4,709,505

CLASS 48

73 4,710,202

CLASS 49

88 4,709,506

CLASS 51

7 4,709,507
105 R 4,709,508
165.71 4,709,509
177 4,709,510
216 R 4,709,511
237 R 4,709,512
283 R 4,709,513
325 4,709,514
436 4,709,515

CLASS 52

11 4,709,516
36 4,709,517
94 4,709,518
98 4,709,519
191 4,709,520
220 4,709,521
287 4,709,522
406 4,709,523
536 4,709,524
718.1 4,709,525
749 4,709,526
4,709,527

CLASS 53

128 4,709,528
207 4,709,529
209 4,709,530
415 4,709,531
451 4,709,532
4,709,533
452 4,709,534
473 4,709,535
539 4,709,536
550 4,709,537
566 4,709,538

CLASS 54

23 4,709,539

CLASS 55

2 4,710,203
16 4,710,204
58 4,710,206
158 4,710,205
290 4,710,207
355 4,710,208
418 4,710,209

CLASS 56

13.6 4,709,540
202 4,709,541
396 Re.32,551

CLASS 57

16 4,709,542
58.7 4,709,543
218 4,709,544

CLASS 60

39.08 4,709,545
39.29 4,709,546
274 4,709,547
280 4,709,548
295 4,709,549
562 4,709,550
589 4,709,551
600 4,709,552
602 4,709,553

CLASS 62

17 4,710,210
4,710,211
23 4,710,212
28 4,710,213
4,710,214
156 4,709,554
228.3 4,709,555
298 4,709,556
373 4,709,557
480 4,709,558
499 4,709,559
508 4,709,560
532 4,710,215

CLASS 65

4.1 4,710,216
31 4,710,217
260 4,710,218

CLASS 66

8 4,709,561
193 4,709,562
222 4,709,563

CLASS 70

25 4,709,564
107 4,709,565
129 4,709,566
455 4,709,567

CLASS 71

11 4,710,219
67 4,710,220
93 4,710,221

CLASS 72

201 4,709,568
340 4,709,569
365 4,709,570
366 4,709,571
4,709,572
379 4,709,573
405 4,709,574

CLASS 73

23 4,709,575
40.5 R 4,709,576
40.7 4,709,577
49.3 4,709,578
76 4,709,579
178 R 4,709,580
202 4,709,581
622 4,709,582
861.17 4,709,583
864.44 4,709,584
866.4 4,709,585

CLASS 74

5.12 4,709,586
15.63 4,709,587
103 4,709,588
206 4,709,589
331 4,709,590
422 4,709,591
493 4,709,592
498 4,709,593
753 4,709,594
864 4,709,595
868 4,709,596
4,709,597

CLASS 75

84.1 R 4,710,222
248 4,710,223

CLASS 76

114 4,709,598

CLASS 81

57.18 4,709,599
57.39 4,709,600
367 4,709,601
483 4,709,602

CLASS 82

2.5 4,709,603
4 C 4,709,604

CLASS 83

23 4,709,605
94 4,709,606
342 4,709,607
355 4,709,608
435.2 4,709,609
876 4,709,610

CLASS 84

1.22 4,709,611
314 N 4,709,612
413 4,709,613

CLASS 89

1.35 4,709,614
1.56 4,709,615
26 4,709,616
157 4,709,617

CLASS 91

31 4,709,618

CLASS 92

130 D 4,709,619
187 4,709,620
212 4,709,621

CLASS 98

2 4,709,622
40.05 4,709,623
119 4,709,624

CLASS 99

289 R 4,709,625
426 4,709,626

CLASS 100

30 4,709,627
148 4,709,628
162 B 4,709,629

CLASS 101

93.22 4,709,630
129 4,709,631
163 4,709,632
4,709,633
248 4,709,634
426 4,709,635

CLASS 102

431 4,709,636
481 4,709,637
522 4,709,638

CLASS 104

292 4,709,639

CLASS 106

1.23 4,710,224
104 4,710,225
119 4,710,226
193 R 4,710,227
218 4,710,228
281 R 4,710,229
308 N 4,710,230

CLASS 108

91 4,709,640
102 4,709,641
111 4,709,642

CLASS 109

21.5 4,709,659

CLASS 110

336 4,709,643

CLASS 112

237 4,709,644
282 4,709,645

CLASS 114

5 4,709,646
267 4,709,647
363 4,709,648
4,709,649
375 4,709,650

CLASS 116

137 R 4,709,651
140 4,709,652
228 4,709,653
283 4,709,654

CLASS 118

719 4,709,655
723 4,709,656

CLASS 119

5 4,709,657
18 4,709,658
95 4,709,661
103 4,709,660

CLASS 122

4 D 4,709,662
4,709,663
379 4,709,664
510 4,709,665

CLASS 123

41.12 4,709,666
90.34 4,709,667
90.55 4,709,668
149 D 4,709,669
195 C 4,709,670
196 S 4,709,671
256 4,709,672
299 4,709,673
339 4,709,674
376 4,709,675
383 4,709,676
425 4,709,678
438 4,709,677
447 4,709,679
467 4,709,680
531 4,709,681
559 4,709,682
560 4,709,683
644 4,709,684

CLASS 124

7 4,709,685
67 4,709,686

CLASS 126

42 4,709,687
415 4,709,688
448 4,709,689

CLASS 127

30 4,710,231

CLASS 128

1 R 4,709,690
66 4,709,691
78 4,709,692
80 G 4,709,693
87 A 4,709,694
132 R 4,709,695
201.12 4,709,696
303 R 4,709,697
303.12 4,709,698
317 4,709,699
421 4,709,700
422 4,709,701
644 4,709,702
4,709,704
654 4,709,703
750 4,709,705

CLASS 131

240.1 4,709,706
276 4,709,707
302 4,709,708
306 4,709,709
308 4,709,710
336 4,709,711

CLASS 132

7 4,709,712

CLASS 134

1 4,710,232
4,710,233
72 4,709,713
89 4,709,714
122 R 4,709,716
172 4,709,715
199 4,709,717

CLASS 135

106 4,709,718

CLASS 136

206 4,710,588
258 PC 4,710,589

CLASS 137

268 4,709,719
385 4,709,720
437 4,709,721
539 4,709,722
584 4,709,723
596 4,709,724
614.04 4,709,725
4,709,726
625.66 4,709,727
636.4 4,709,728

CLASS 138

99 4,709,729
111 4,709,730
121 4,709,731

CLASS 139

383 A 4,709,732

CLASS 140

147 4,709,733

CLASS 141

2 4,709,734
209 4,709,735

CLASS 144

2 N 4,709,736
241 4,709,737

CLASS 148

4 4,710,235
11.5 P 4,710,236
12.4 4,710,245
13 4,710,237
16.6 4,710,238
101 4,710,239
156 4,710,240
301 4,710,242
312 4,710,243
333 4,710,244
403 4,710,246
429 4,710,247

CLASS 149

21 4,710,248

CLASS 152

400 4,709,738
453 4,709,739

CLASS 156

64 4,710,249
89 4,710,250
137 4,710,251
195 4,710,252
272.8 4,710,253
278 4,710,254
361 4,710,255
484 4,710,256
578 4,710,257
601 4,710,258
4,710,259
605 4,710,260
626 4,710,261
630 4,710,262
637 4,710,263

CLASS 159

7 4,710,266

CLASS 162

5 4,710,267
23 4,710,268
30.1 4,710,269
175 4,710,270
360.1 4,710,271

CLASS 164

5 4,709,740

35 4,709,741
76.1 4,709,742
463 4,709,743
472 4,709,744
484 4,709,745
485 4,709,746
487 4,709,747
488 4,709,748
503 4,709,749

CLASS 165

10 4,709,750
17 4,709,751
47 4,709,752
125 4,709,753
133 4,709,754
160 4,709,755
162 4,709,756
173 4,709,757

CLASS 166

120 4,709,758
275 4,709,759
285 4,709,760
324 4,709,762
387 4,709,761

CLASS 169

26 4,709,763

CLASS 173

45 4,709,764
119 4,709,765

CLASS 174

35 GC 4,710,590
4,710,591
68.5 4,710,592
88 R 4,710,593
120 SR 4,710,594

CLASS 175

52 4,709,766
65 4,709,767
296 4,709,768

CLASS 177

1 4,709,769
50 4,709,770

CLASS 178

18 4,710,595

CLASS 180

6.5 4,709,771
8.2 4,709,772
9.32 4,709,773
229 4,709,774
233 4,709,775
281 4,709,776
286 4,709,777
292 4,709,778
300 4,709,779

CLASS 181

213 4,709,780
290 4,709,781

CLASS 182

3 4,709,782
8 4,709,783
16 4,709,784

CLASS 184

6.4 4,709,785

CLASS 187

9 E 4,709,786
56 4,709,787
124 4,709,788

CLASS 188

73.44 4,709,789
300 4,709,790
315 4,709,791

CLASS 192

0.044 4,709,792
4 A 4,709,793
18 B 4,709,794
106 F 4,709,795
106.1 4,709,796
106.2 4,709,797

CLASS 198

380 4,709,798
412 4,709,799
459 4,709,800
464.2 4,709,801
465.1 4,709,802
468.2 4,709,803
719 4,709,804
750 4,709,805
819 4,709,806
853 4,709,807

CLASS 200

5 A 4,710,597
21 4,710,598
61.85 4,710,599
291 4,710,600
302.3 4,710,601
315 4,710,602
501.15 4,710,321

CLASS 202

205 4,710,272

CLASS 203

29 4,710,273
51 4,710,274
4,710,275

CLASS 204

9 4,710,276
119 4,710,277
129 4,710,278
129.55 4,710,279
146 4,710,280
181.7 4,710,281
228 4,710,282
298 4,710,283

CLASS 206

158 4,709,808
162 4,709,809
205 4,709,810
254 4,709,811
310 4,709,812
312 4,709,813
315.3 4,709,814
387 4,709,815
444 4,709,816
523 4,709,817
524.8 4,709,818
4,709,819

CLASS 209

17 4,710,284
166 4,710,285
250 4,710,286
270 4,710,287
534 4,709,820

CLASS 210

111 4,710,288
198.2 4,710,289
199 4,710,290
4,710,291
218 4,710,292
225 4,710,293
232 4,710,294
336 4,710,295
420 4,710,296
493.2 4,710,297
505 4,710,298
512.1 4,710,299
603 4,710,300
605 4,710,301
696 4,710,302
698 4,710,303
734 4,710,304
747 4,710,305

CLASS 215

1 R 4,709,821
216 4,709,822
235 4,709,823
252 4,709,824
318 4,709,825

CLASS 219

69 C 4,710,603
121 LJ 4,710,605
121 LU 4,710,604
4,710,606
121 P 4,710,607
161 4,710,608
222 4,710,609
363 4,710,610
450 4,710,611
547 4,710,612

CLASS 220

1 C 4,709,826
4 A 4,709,827
76 4,709,828
90.2 4,709,829
258 4,709,830
304 4,709,831
306 4,709,832
319 4,709,833
326 4,709,834

CLASS 222

87 4,709,835
490 4,709,836
636 4,709,837

CLASS 223

85 4,709,838
119 4,709,839

CLASS 224

314 4,709,840

CLASS 227

55 4,709,841
120 4,709,842
156 4,709,843

CLASS 228

3.1 4,709,844
17 4,709,845
34 4,709,846
49.1 4,709,847
159 4,709,848
246 4,709,849

CLASS 229

73 4,709,850
87 B 4,709,851
119 4,709,852

CLASS 232

39 4,709,853

CLASS 235

380 4,710,613
4,710,614
454 4,710,615
472 4,710,616
487 4,710,617

CLASS 236

20 R 4,709,854

CLASS 237

12.3 A 4,709,855

CLASS 238

10 E 4,709,856

CLASS 239

164 4,709,857
296 4,709,858
525 4,709,859
654 4,709,860
675 4,709,861

CLASS 241

23 4,709,862
69 4,709,863
167 4,709,864
169.1 4,709,865

CLASS 242

18 A 4,709,866
56 R 4,709,867
4,709,868
68 4,709,870
68.3 4,709,871
75.43 4,709,872
195 4,709,873
220 4,709,874
673 R 4,709,869

CLASS 244

3.13 4,709,875
3.16 4,709,876
3.28 4,709,877
12.1 4,709,879
12.5 4,709,880
17.15 4,709,881
53 R 4,709,882
63 4,709,883
139 4,709,884
141 4,709,885
328 4,709,878

CLASS 248

49 4,709,886
66 4,709,887
73 4,709,888
74.5 4,709,889
205.1 4,709,890
214 4,709,891
250 4,709,892
360 4,709,893
406.2 4,709,894
460 4,709,895
550 4,709,896
551 4,709,897
562 4,709,898

CLASS 249

20 4,709,899

CLASS 250

203 R 4,710,618
4,710,619
4,710,620
4,710,621
214 R 4,710,622
227 4,710,623
228 4,710,624
305 4,710,625
327.2 4,710,626
339 4,710,627
341 4,710,628
342 4,710,629
353 4,710,630
354.1 4,710,631
396 R 4,710,632
442.1 4,710,633
455.1 4,710,634
461.2 4,710,635
467.1 4,710,636
486.1 4,710,637
492.1 4,710,638
492.2 4,710,639
4,710,640
554 4,710,641
571 4,710,642
573 4,710,643

CLASS 251

5 4,709,900
58 4,709,901
315 4,709,902

CLASS 252

8.551 4,710,306
18 4,710,307
42.7 4,710,308
62 4,710,309
62.2 4,710,310
62.9 4,710,311
68 4,710,312
105 4,710,313
117 4,710,314
299.63 4,710,315
609 4,710,317
628 4,710,318
646 4,710,319

CLASS 260

378 4,710,320
511 4,710,322
543 R 4,710,323

CLASS 261

24 4,710,325
30 4,710,324
112 4,710,326

CLASS 264

1.7 4,710,327
4,710,328
3.1 4,710,329
25 4,710,330
41 4,710,331
60 4,710,332
73 4,710,333
102 4,710,334
105 4,710,335
171 4,710,336
508 4,710,337
509 4,710,338

CLASS 266

227 4,709,903
250 4,709,904
270 4,709,905

CLASS 267

103 4,709,906
140.1 4,709,907
140.4 4,709,908

CLASS 269

41 4,709,909

CLASS 270

55 4,709,910

CLASS 271

10 4,709,911
42 4,709,912
207 4,709,913
263 4,709,914
288 4,709,915

CLASS 272

67 4,709,916
73 4,709,917
97 4,709,918
117 4,709,919
4,709,920
119 4,709,921
123 4,709,922
134 4,709,923

CLASS 273

26 R 4,709,924
29 A 4,709,925
257 4,709,926
286 4,709,927
309 4,709,928
402 4,709,929

CLASS 277

68 4,709,930
153 4,709,931
165 4,709,932
167.5 4,709,933

CLASS 280

6 R 4,709,934
11.2 4,709,937
91 4,709,935
4,709,936
154.5 R 4,709,938
242 WC 4,709,939
405 R 4,709,940
461 A 4,709,941
618 4,709,942
751 4,709,943
777 4,709,944

CLASS 285

4 4,709,945
55 4,709,946
150 4,709,947
381 4,709,948

CLASS 292

6 4,709,949
92 4,709,950
189 4,709,951

CLASS 294

82.14 4,709,952
106 4,709,953
142 4,709,954

CLASS 296

3 4,709,955
100 4,709,956
146 4,709,957
177 4,709,958
217 4,709,959

CLASS 297

250 4,709,960
284 4,709,961
301 4,709,962
316 4,709,963
354 4,709,964
366 4,709,965
473 4,709,966

CLASS 301

37 P 4,709,967

CLASS 303

6 C 4,709,968
114 4,709,969

CLASS 307

95 4,710,644
115 4,710,645
116 4,710,646
297 4,710,647
443 4,710,648
451 4,710,649
452 4,710,650
462 4,710,651
491 4,710,652
518 4,710,653
601 4,710,654

CLASS 310

30 4,710,655
51 4,710,656
62 4,710,657
71 4,710,658
153 4,710,659
178 4,710,660
198 4,710,661
204 4,710,662
214 4,710,663
217 4,710,664
219 4,710,665
248 4,710,666
268 4,710,667
323 4,710,668

CLASS 312

140.4 4,709,970
201 4,709,971
208 4,709,972

CLASS 313

402 4,710,669
407 4,710,670
413 4,710,671
4,710,672
477 R 4,710,673
489 4,710,674
532 4,710,675
579 4,710,676
580 4,710,677

CLASS 315

39 4,710,678
58 4,710,679
169.4 4,710,680
209 T 4,710,681
224 4,710,682

CLASS 318

254 4,710,683
4,710,684
287 4,710,685
293 4,710,686
561 4,710,687
603 4,710,688
630 4,710,689
685 4,710,690
696 4,710,691
729 4,710,692

CLASS 320

2 4,710,693
21 4,710,694
4,710,695

CLASS 323

223 4,710,696
239 4,710,697
4,710,698
324 4,710,699

CLASS 324

58.5 A 4,710,700
61 P 4,710,701
73 R 4,710,704
79 R 4,710,702
86 4,710,703
102 4,710,705
146 4,710,706
158 F 4,710,707
207 4,710,708
4,710,709
220 4,710,710
221 4,710,711
227 4,710,712
303 4,710,713
307 4,710,714
4,710,715
309 4,710,716
4,710,717
4,710,718
318 4,710,719
550 4,710,720

CLASS 328

109 4,710,721
234 4,710,722

CLASS 329

192 4,710,723

CLASS 330

9 4,710,724
51 4,710,725
69 4,710,726
110 4,710,727
252 4,710,728

CLASS 331

96 4,710,729
116 FE 4,710,730
158 4,710,731

CLASS 332

7.51 4,710,732
26 4,710,733

CLASS 333

101 4,710,734
175 4,710,735
241 4,710,736

CLASS 334

56 4,710,737

CLASS 335

172 4,710,738
174 4,710,739
248 4,710,740
296 4,710,741

CLASS 337

323 4,710,742
380 4,710,743

CLASS 338

4 4,710,744

CLASS 340

63 4,710,745
347 AD 4,710,747
4,710,748
347 DD 4,710,746
405 4,710,749
522 4,710,750
4,710,751
551 4,710,752
561 4,710,753
572 4,710,754
585 4,710,755
628 4,710,756
632 Re.32,552
684 4,710,757
712 4,710,758
4,710,759
4,710,760
721 4,710,761
4,710,762
723 4,710,763
728 4,710,764
781 4,710,765
784 4,710,766
799 4,710,767
805 4,710,768
811 4,710,771
825.030 4,710,769

870.18 4,710,770

CLASS 342

92 4,710,772
185 4,710,773
455 4,710,774

CLASS 343

727 4,710,775
778 4,710,776
840 4,710,777
882 4,710,778

CLASS 346

1.1 4,710,779
4,710,780
76 PH 4,710,781
4,710,783
76 R 4,710,782
140 R 4,710,784
153.1 4,710,785

CLASS 350

96.14 4,709,977
4,709,978
96.20 4,709,979
4,709,980
96.21 4,709,981
96.23 4,709,982
4,709,983
4,709,984
96.25 4,709,985
96.33 4,709,986
96.34 4,709,987
276 R 4,709,988
321 4,709,989
339 F 4,709,990
4,709,993
339 R 4,709,991
4,709,992
350 S 4,709,994
4,709,995
418 4,709,996
427 4,709,997
454 4,709,998
486 4,709,999
516 4,710,000
632 4,710,001

CLASS 351

205 4,710,002
212 4,710,003

CLASS 353

81 4,710,004

CLASS 354

126 4,710,005
204 4,710,006
286 4,710,007
289.1 4,710,008
322 4,710,009
400 4,710,010
403 4,710,011
415 4,710,012
419 4,710,013
427 4,710,014

CLASS 355

3 DD 4,710,015
4 4,710,016
8 4,710,017
4,710,018
38 4,710,019

CLASS 356

1 4,710,020
72 4,710,021
73.1 4,710,022
124 4,710,023
328 4,710,024
343 4,710,025
349 4,710,026
350 4,710,027
375 4,710,028
401 4,710,029
432 4,710,030
440 4,710,031

CLASS 357

2 4,710,786
16 4,710,787
22 4,710,788
23.13 4,710,791
23.6 4,710,789
4,710,790
38 4,710,792
44 4,710,793
49 4,710,794
65 4,710,795
72 4,710,796
74 4,710,797
80 4,710,798

CLASS 358

12 4,710,799
22 4,710,800
23 4,710,801
25 4,710,802
41 4,710,803
48 4,710,804
81 4,710,805
4,710,806
4,710,807
98 4,710,808
107 4,710,809
109 4,710,810
133 4,710,811
135 4,710,812
136 4,710,813
143 4,710,814
186 4,710,815
213.11 4,710,817
213.15 4,710,816
214 4,710,818
229 4,710,819
231 4,710,820
256 4,710,821
280 4,710,822
4,710,823
310 4,710,824
342 4,710,825

CLASS 360

9.1 4,710,826
10.1 4,710,827
10.2 4,710,832
75 4,710,828
97 4,710,829
4,710,830
99 4,710,831
105 4,710,833
4,710,834
106 4,710,835
4,710,836
110 4,710,837
125 4,710,838
133 4,710,839

CLASS 361

20 4,710,840
23 4,710,841
88 4,710,842
96 4,710,843
4,710,844
4,710,845
119 4,710,846
125 4,710,847
228 4,710,849
280 4,710,848
333 4,710,850
384 4,710,851
386 4,710,852
391 4,710,853
414 4,710,854

CLASS 362

66 4,710,855
74 4,710,856
80 4,710,857
95 4,710,858

CLASS 363

21 4,710,859
28 4,710,860
46 4,710,861
58 4,710,862

CLASS 364

146 4,710,863
148 4,710,864
170 4,710,865
200 4,710,866
4,710,867
4,710,868
4,710,869
4,710,870
4,710,871
300 4,710,872
410 4,710,873
413 4,710,874
414 4,710,875
4,710,876
419 4,710,877
424 4,710,878
424.1 4,710,879
426 4,710,880
431.08 4,710,881
464 4,710,882
466 4,710,883
513 4,710,884
518 4,710,885
519 4,710,886
555 4,710,887
561 4,710,888
571 4,710,889
703 4,710,890
718 4,710,891
729 4,710,892
900 4,710,893
4,710,894

CLASS 365

2 4,710,895
113 4,710,899
149 4,710,896
182 4,710,897
189 4,710,898
4,710,900
190 4,710,901
194 4,710,903
222 4,710,902
226 4,710,904
229 4,710,905

CLASS 366

156 4,710,032

CLASS 367

35 4,710,906

CLASS 369

6 4,710,907
32 4,710,908
46 4,710,909
75.2 4,710,910
100 4,710,911
218 4,710,912
280 4,710,913

CLASS 370

3 4,710,914
16 4,710,915
58 4,710,916
62 4,710,917
85 4,710,918
96 4,710,919
100 4,710,920
110.1 4,710,921
112 4,710,922

CLASS 371

2 4,710,923
4 4,710,924
5 4,710,925
9 4,710,926
15 4,710,927
16 4,710,928
22 4,710,929
25 4,710,930
4,710,931
4,710,932
4,710,933
38 4,710,934
49 4,710,935

CLASS 372

45 4,710,936
53 4,710,937
56 4,710,938
73 4,710,939
75 4,710,940
87 4,710,941
4,710,942

CLASS 374

161 4,710,033

CLASS 375

7 4,710,943
40 4,710,944
100 4,710,945

CLASS 376

123 4,710,339
209 4,710,340
216 4,710,341
272 4,710,342
414 4,710,343

CLASS 378

62 4,710,946
147 4,710,947
208 4,710,948

CLASS 379

26 4,710,949
70 4,710,950
100 4,710,951
269 4,710,952
391 4,710,953
424 4,710,596
427 4,710,954

CLASS 380

10 4,710,955
20 4,710,956
42 4,710,957

CLASS 381

10 4,710,958
36 4,710,959
47 4,710,960
68.7 4,710,961
102 4,710,962

CLASS 382

7 4,710,963
17 4,710,964
41 4,710,965
69 4,710,966

CLASS 383

8 4,710,967
63 4,710,968

CLASS 384

110 4,710,034
115 4,710,035
275 4,710,036
537 4,710,037
569 4,710,038
574 4,710,039

CLASS 400

55 4,710,040
120 4,710,041
141 4,710,042
144.2 4,710,043
208 4,710,044
352 4,710,045
556.2 4,710,046
697 4,710,047

CLASS 401

269 4,710,048

CLASS 403

23 4,710,049
51 4,710,050
227 4,710,051
310 4,710,052

CLASS 404

9 4,710,053
110 4,710,054
112 4,710,055

CLASS 405

15 4,710,056
30 4,710,057
146 4,710,058
162 4,710,059
166 4,710,060
195 4,710,061
262 4,710,062
269 4,710,063
290 4,710,064
303 4,710,065

CLASS 406

29 4,710,066
64 4,710,067
88 4,710,068

CLASS 407

114 4,710,069

CLASS 408

18 4,710,072
93 4,710,070
133 4,710,071
181 4,710,073
200 4,710,074
202 4,710,075

CLASS 409

26 4,710,076
232 4,710,077
233 4,710,078
234 4,710,079

CLASS 411

82 4,710,080
161 4,710,081
373 4,710,082
466 4,710,083

CLASS 412

9 4,710,084

CLASS 414

27 4,710,085
44 4,710,086
4,710,087
113 4,710,088
118 4,710,089
550 4,710,090
623 4,710,091
729 4,710,092
730 4,710,093
752 4,710,094

CLASS 415

48 4,710,095
121 G 4,710,096
138 4,710,097
149 A 4,710,098
199.5 4,710,099

CLASS 416

11 4,710,100
32 4,710,101
190 4,710,102
219 R 4,710,103

CLASS 417

53 4,710,104
68 4,710,105
213 4,710,106
269 4,710,107
298 4,710,108
454 4,710,109

CLASS 418

15 4,710,110
63 4,710,111

CLASS 419

8 4,710,344
28 4,710,345
68 4,710,346

CLASS 420

94 4,710,347
129 4,710,348
495 4,710,349

CLASS 422

37 4,710,350
50 4,710,351
63 4,710,352
68 4,710,353
80 4,710,354
100 4,710,355
140 4,710,356
144 4,710,357
186.05 4,710,358
191 4,710,359
269 4,710,360

CLASS 423

26 4,710,361
228 4,710,362
239 4,710,363
244 4,710,364
4,710,365
321 R 4,710,366
335 4,710,367
344 4,710,368
625 4,710,369

CLASS 424

9 4,710,370
47 4,710,371
49 4,710,372
59 4,710,373
61 4,710,374
69 4,710,375
83 4,710,376
88 4,710,377
89 4,710,378
93 4,710,379
101 4,710,380
4,710,381
108 4,710,382
449 4,710,383
465 4,710,384

CLASS 425

64 4,710,112
67 4,710,113
110 4,710,114
117 4,710,115
125 4,710,116
126 R 4,710,117
130 4,710,118
136 4,710,119
185 4,710,120
190 4,710,121
259 4,710,122
464 4,710,123
554 4,710,124

CLASS 426

1 4,710,385
28 4,710,386
72 4,710,387
102 4,710,388
231 4,710,389
285 4,710,390
289 4,710,391
534 4,710,392
660 4,710,393

CLASS 427

4 4,710,394
8 4,710,395
4,710,396
53.1 4,710,397
121 4,710,400
4,710,401
244 4,710,402
304 4,710,403
386 4,710,404
387 4,710,405
389.8 4,710,406
389.9 4,710,407
393.5 4,710,408
421 4,710,409
430.1 4,710,410

CLASS 428

34 4,710,411
36 4,710,412
4,710,413
43 4,710,414
48 4,710,415
119 4,710,416
182 4,710,417
192 4,710,418
210 4,710,419
212 4,710,420
213 4,710,421
248 4,710,422
272 4,710,423
325 4,710,424
328 4,710,425
336 4,710,426
407 4,710,427
408 4,710,428
417 4,710,429
432 4,710,430
457 4,710,431
542.8 4,710,432
623 4,710,433
678 4,710,434
698 4,710,435

CLASS 429

41 4,710,436
101 4,710,437
119 4,710,438
194 4,710,439

CLASS 430

5 4,710,440
62 4,710,441
85 4,710,442
106.6 4,710,443
237 4,710,444
252 4,710,445
281 4,710,446
293 4,710,447
314 4,710,448
326 4,710,449
351 4,710,450
441 4,710,451
495 4,710,452
505 4,710,453
546 4,710,454
564 4,710,456
567 4,710,455

CLASS 431

22 4,710,125

CLASS 432

58 4,710,126

CLASS 433

215 4,710,127

CLASS 434

46 4,710,128
55 4,710,129
157 4,710,130

CLASS 435

7 4,710,457
12 4,710,458
13 4,710,459
15 4,710,460
68 4,710,461
4,710,462
4,710,463
91 4,710,464
4,710,465
4,710,466
108 4,710,467
135 4,710,468
194 4,710,469
200 4,710,470
253 4,710,471
287 4,710,472
320 4,710,473

CLASS 436

60 4,710,474
86 4,710,475
172 4,710,476

CLASS 437

5 4,709,466
29 4,710,265
30 4,709,467
34 4,710,477
40 4,710,234
4,710,478
63 4,709,469
162 4,710,241
209 4,709,468
228 4,710,264
235 4,710,398
245 4,710,399

CLASS 439

13 4,710,131
78 4,709,973
79 4,710,132
92 4,710,133
264 4,710,134
345 4,709,974
350 4,709,975
4,709,976
354 4,710,135
374 4,710,136

CLASSIFICATION OF PATENTS

457 4,710,137
581 4,710,138
668 4,710,139
733 4,710,140

CLASS 440

61 4,710,141
83 4,710,142

CLASS 441

65 4,710,143
79 4,710,144

CLASS 446

100 4,710,145
308 4,710,146
464 4,710,147
4,710,148
476 4,710,149

CLASS 455

67 4,710,969
113 4,710,970
179 4,710,971
4,710,972
180 4,710,973
190 4,710,974
276 4,710,975
601 4,710,976
603 4,710,977

CLASS 464

14 4,710,150

CLASS 474

28 4,710,151
166 4,710,152
211 4,710,153
242 4,710,154
260 4,710,155

CLASS 493

1 4,710,156
213 4,710,157
328 4,710,158

CLASS 494

27 4,710,159
64 4,710,160
84 4,710,161

CLASS 501

15 4,710,479
95 4,710,480
123 4,710,481

CLASS 502

127 4,710,482
185 4,710,483
208 4,710,484
213 4,710,485
219 4,710,486
303 4,710,487

CLASS 512

20 4,710,316

CLASS 514

6 4,710,488
18 4,710,489
25 4,710,490
42 4,710,491
50 4,710,492
56 4,710,493
143 4,710,494
174 4,710,495
183 4,710,496
221 4,710,497
242 4,710,498
247 4,710,499
254 4,710,500
256 4,710,501
259 4,710,502
263 4,710,503
267 4,710,504
278 4,710,505
301 4,710,506
312 4,710,507
357 4,710,508
384 4,710,509
394 4,710,510
411 4,710,511
431 4,710,512
460 4,710,513
485 4,710,514
563 4,710,515
594 4,710,516
616 4,710,517
624 4,710,518
629 4,710,519

CLASS 521

55 4,710,520
118 4,710,521
138 4,710,522

CLASS 522

14 4,710,523
75 4,710,524

CLASS 523

201 4,710,525

CLASS 524

5 4,710,526
98 4,710,527
100 4,710,528
139 4,710,529
142 4,710,530
239 4,710,531
310 4,710,532
394 4,710,533
411 4,710,534
413 4,710,535
493 4,710,536
549 4,710,537

CLASS 525

53 4,710,538
59 4,710,539
101 4,710,540
104 4,710,541
127 4,710,542
161 4,710,543
194 4,710,544
340 4,710,545
420 4,710,546
437 4,710,547
439 4,710,548
538 4,710,549

CLASS 526

60 4,710,550
91 4,710,551
116 4,710,552
142 4,710,553
180 4,710,554
240 4,710,555
273 4,710,556
289 4,710,557

CLASS 528

14 4,710,558
15 4,710,559
67 4,710,560
111 4,710,561
125 4,710,562
501 4,710,563

CLASS 536

6.4 4,710,564
16.5 4,710,565
28 4,710,566
119 4,710,567

CLASS 540

350 4,710,568

CLASS 544

31 4,710,569
4,710,570
216 4,710,571
267 4,710,572

CLASS 546

199 4,710,573

CLASS 548

533 4,710,574

CLASS 556

1 4,710,575
40 4,710,576
137 4,710,577

CLASS 558

4 4,710,578
86 4,710,580
169 4,710,579

CLASS 560

20 4,710,581
35 4,710,582
40 4,710,583
51 4,710,584
64 4,710,585
68 4,710,586

CLASS 568

454 4,710,587

CLASS 604

51 4,710,162
65 4,710,163
66 4,710,164
67 4,710,165
81 4,710,166
93 4,710,167
99 4,710,168
104 4,710,169
110 4,710,170
117 4,710,171
118 4,710,172
168 4,710,173
175 4,710,174
177 4,710,175
4,710,176
185 4,710,177
209 4,710,178
211 4,710,179
239 4,710,180
280 4,710,181
339 4,710,182
344 4,710,183
368 4,710,184
372 4,710,185
383 4,710,186
385 A 4,710,187
4,710,189
385 R 4,710,188
389 4,710,190
897 4,710,191

CLASS 623

1 4,710,192
6 4,710,193
4,710,194
4,710,195
4,710,196
4,710,197

CLASSIFICATION OF DESIGNS

D1— 122 292,940
D2— 314 292,941
292,942
292,943
292,944
292,945
320 292,946
D3— 10 292,947
D4— 104 292,948
116 292,949
D5— 61 293,039
D6— 356 292,950
388 292,952
405 292,953
409 292,954
292,955
449 292,956
470 292,951
475 292,957
522 292,958
D7— 103 292,959
137 292,960
309 292,961
D8— 50 292,962
51 292,963
344 292,964
D9— 370 292,968
418 292,965
436 292,966
439 292,967
D10— 46.1 292,969
75 292,979
D12— 3 292,970
37 292,971
136 292,972
317 292,973
D13— 40 292,974
D14— 65 292,975
94 292,976
111 292,977
D15— 7 292,978
16 292,980
199 292,981
D16— 46 292,982
102 292,983
292,984
292,985
107 292,986
D17— 18 292,987
D18— 27 292,988
D19— 26 292,989
32 292,990
75 292,992
78 292,991
D20— 5 292,993
10 292,995
20 292,994
42 292,996
D21— 5 292,997
37 292,998
292,999
65 293,000
87 293,001
293,002
91 293,003
158 293,004
160 293,005
168 293,006
191 293,007
199 293,008
293,009
227 293,010
237 293,011
293,012
D22— 118 293,013
123 293,014
129 293,015
D23— 209 293,016
212 293,017
226 293,018
301 293,019
332 293,020
354 293,022
D24— 17 293,023
31 293,024
D25— 129 293,025
D26— 24 293,026
46 293,027
51 293,028
60 293,029
107 293,030
118 293,031
120 293,032
293,033
D28— 7 293,034
293,035
48 293,036
D32— 6 293,021
D34— 7 293,038
35 293,037

CLASSIFICATION OF PLANTS

P.— 45 6,047
68 6,048
72 6,049
74 6,050
79 6,051
80 6,052

STATUTORY INVENTION REGISTRATIONS

29— 599 H383
30— 276 H380
382 H378
60— 230 H384
71— 92 H386
102— 517 H382
252— 8.51 H385
281— 2 H377
324— 58.5 B H395
333— 114 H392
356— 239 H376
357— 22 H390
358— 139 H393
361— 215 H394
367— 19 H388
154 H387
159 H391
372— 58 H389
374— 142 H381
439— 610 H379

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,709,639
4,709,860
4,709,876
4,710,057
4,710,912
02 : 4,710,054
04 : 4,709,440
4,709,506
4,709,577
4,709,722
4,709,764
4,709,801
4,709,855
4,709,879
4,710,419
4,710,728
4,710,767
4,710,793
06 : Re.32,552
4,709,441
4,709,464
4,709,467
4,709,475
4,709,483
4,709,493
4,709,502
4,709,566
4,709,580
4,709,602
4,709,612
4,709,643
4,709,655
4,709,690
4,709,695
4,709,758
4,709,766
4,709,780
4,709,817
4,709,822
4,709,825
4,709,826
4,709,839
4,709,863
4,709,865
4,709,882
4,709,886
4,709,939
4,709,940
4,709,954
4,709,996
4,710,001
4,710,025
4,710,027
4,710,036
4,710,045
4,710,048
4,710,049
4,710,053
4,710,068
4,710,100
4,710,102
4,710,124
4,710,145
4,710,163
4,710,170
4,710,172
4,710,176
4,710,179
4,710,201
4,710,223
4,710,235
4,710,254
4,710,272
4,710,279
4,710,324
4,710,332
4,710,339
4,710,360
4,710,367
4,710,388
4,710,401
4,710,433
4,710,441
4,710,442
4,710,448
4,710,473
4,710,477
4,710,483
4,710,485
4,710,486
4,710,497
4,710,548
4,710,588
4,710,618
4,710,624
4,710,625
4,710,635
4,710,660
4,710,666
4,710,686
4,710,691
4,710,693
4,710,708
4,710,714
4,710,733
4,710,734
4,710,745
4,710,747
4,710,750
4,710,751
4,710,756
4,710,757
4,710,774
4,710,813
4,710,841
4,710,851
4,710,872
4,710,893
4,710,919
4,710,922
4,710,924
4,710,927
4,710,935
4,710,940
4,710,970
08 : 4,709,567
4,709,585
4,709,654
4,709,719
4,709,815
4,709,838
4,709,873
4,709,919
4,710,370
4,710,956
09 : 4,709,461
4,709,477
4,709,545
4,709,617
4,709,664
4,709,679
4,709,749
4,709,923
4,710,097
4,710,465
4,710,492
4,710,537
4,710,542
4,710,749
4,710,752
4,710,844
4,710,882
4,710,883
4,710,920
10 : 4,709,466
4,709,608
4,710,221
4,710,408
4,710,513
4,710,527
4,710,544
4,710,572
4,710,576
11 : 4,709,503
12 : 4,709,420
4,709,431
4,709,527
4,709,603
4,709,635
4,709,649
4,709,692
4,709,706
4,709,925
4,709,928
4,710,050
4,710,056
4,710,364
4,710,469
4,710,495
4,710,521
4,710,663
4,710,723
4,710,800
13 : 4,709,419
4,709,471
4,709,494
4,709,576
4,709,734
4,709,975
4,710,031
4,710,067
4,710,185
4,710,385
4,710,396
4,710,415
15 : 4,709,883
17 : 4,709,450
4,709,460
4,709,465
4,709,473
4,709,485
4,709,489
4,709,504
4,709,507
4,709,575
4,709,634
4,709,665
4,709,767
4,709,784
4,709,795
4,709,812
4,709,823
4,709,830
4,709,841
4,709,853
4,709,889
4,709,891
4,709,897
4,709,929
4,709,950
4,710,021
4,710,089
4,710,130
4,710,133
4,710,140
4,710,141
4,710,146
4,710,157
4,710,171
4,710,173
4,710,182
4,710,278
4,710,285
4,710,308
4,710,350
4,710,357
4,710,391
4,710,447
4,710,534
4,710,601
4,710,657
4,710,669
4,710,670
4,710,707
4,710,724
4,710,730
4,710,742
4,710,759
4,710,820
4,710,840
4,710,873
4,710,926
4,710,945
4,710,957
4,710,968
18 : 4,709,556
4,709,658
4,709,699
4,709,869
4,709,958
4,710,075
4,710,309
4,710,351
4,710,395
4,710,464
4,710,466
4,710,602
4,710,623
4,710,852
4,710,892
4,710,954
19 : 4,709,447
4,709,896
4,709,924
4,710,598
20 : 4,709,520
4,709,618
4,709,851
21 : Re.32,551
4,709,721
4,710,295
4,710,676
22 : 4,709,501
4,709,515
4,709,538
4,709,599
4,709,727
4,709,760
4,710,273
4,710,306
4,710,366
4,710,369
4,710,380
4,710,549
4,710,581
23 : 4,709,484
24 : 4,709,622
4,709,652
4,709,814
4,709,881
4,709,922
4,709,987
4,710,076
4,710,348
4,710,467
4,710,472
4,710,560
4,710,566
4,710,583
4,710,638
4,710,656
4,710,890
25 : 4,709,429
4,709,453
4,709,476
4,709,514
4,709,542
4,709,662

4,709,663
4,709,824
4,709,831
4,709,840
4,709,918
4,709,986
4,710,002
4,710,020
4,710,319
4,710,341
4,710,425
4,710,462
4,710,490
4,710,539
4,710,630
4,710,649
4,710,674
4,710,679
4,710,772
4,710,824
4,710,877
4,710,903
4,710,916
4,710,959
4,710,966
26 : 4,709,444
4,709,488
4,709,492
4,709,517
4,709,590
4,709,697
4,709,738
4,709,776
4,709,777
4,709,782
4,709,802
4,709,803
4,709,804
4,709,894
4,709,951
4,710,005
4,710,079
4,710,108
4,710,126
4,710,137
4,710,164
4,710,227
4,710,239
4,710,249
4,710,405
4,710,410
4,710,508
4,710,519
4,710,543
4,710,559
4,710,565
4,710,609
4,710,634
4,710,786
4,710,858
4,710,879
4,710,888
4,710,899
27 : 4,709,422
4,709,442
4,709,445
4,709,513
4,709,638
4,709,660
4,709,703
4,709,771
4,709,813
4,709,834
4,709,852
4,709,884
4,709,921
4,709,955
4,710,004
4,710,073
4,710,138
4,710,165

28 : 4,709,648
29 : 4,709,519
30 : 4,709,829
31 : 4,709,446
32 : 4,709,689
33 : 4,709,433
34 : 4,709,516

4,710,190
4,710,205
4,710,228
4,710,403
4,710,414
4,710,475
4,710,515
4,710,744
4,710,754
4,709,698
4,710,177
4,709,623
4,709,746
4,709,753
4,710,037
4,710,120
4,710,158
4,710,204
4,710,325
4,710,610
4,710,274
4,710,275
4,709,541
4,709,601
4,709,750
4,710,115
4,710,382
4,710,567
4,709,970
4,710,118
4,710,426
4,710,891
4,709,535
4,709,587
4,709,707
4,709,713
4,709,745
4,709,759
4,709,763
4,709,849
4,709,908
4,709,978
4,709,980
4,710,186
4,710,283
4,710,292
4,710,371
4,710,376
4,710,390
4,710,404
4,710,439
4,710,440
4,710,457
4,710,502
4,710,511
4,710,520
4,710,530
4,710,538
4,710,545
4,710,555
4,710,562
4,710,573
4,710,605
4,710,650
4,710,675
4,710,697
4,710,709
4,710,727
4,710,760
4,710,761
4,710,846
4,710,870
4,710,929
4,710,944

35 : 4,709,428
36 : 4,709,424

4,710,977
4,710,035
4,710,222
4,710,642
4,710,934
4,709,478
4,709,533
4,709,560
4,709,605
4,709,613
4,709,694
4,709,704
4,709,705
4,709,720
4,709,754
4,709,791
4,709,798
4,709,818
4,709,850
4,709,858
4,709,893
4,709,971
4,709,972
4,710,040
4,710,047
4,710,127
4,710,149
4,710,191
4,710,194
4,710,195
4,710,197
4,710,212
4,710,217
4,710,225
4,710,247
4,710,258
4,710,282
4,710,352
4,710,386
4,710,430
4,710,449
4,710,452
4,710,458
4,710,489
4,710,524
4,710,557
4,710,568
4,710,575
4,710,596
4,710,636
4,710,637
4,710,643
4,710,653
4,710,664
4,710,681
4,710,694
4,710,703
4,710,725
4,710,726
4,710,769
4,710,781
4,710,783
4,710,785
4,710,808
4,710,861
4,710,864
4,710,868
4,710,876
4,710,885
4,710,939
37 : 4,709,426
4,709,439
4,709,641
4,709,645
4,709,691
4,709,819
4,709,906
4,710,200
4,710,532

39 : 4,709,421

40 : 4,709,755
41 : 4,709,432
42 : 4,709,435

4,710,801
4,710,889
4,709,423
4,709,437
4,709,443
4,709,499
4,709,523
4,709,569
4,709,574
4,709,723
4,709,724
4,709,800
4,709,806
4,709,808
4,709,848
4,709,926
4,709,947
4,710,038
4,710,077
4,710,085
4,710,095
4,710,098
4,710,175
4,710,189
4,710,193
4,710,261
4,710,286
4,710,344
4,710,411
4,710,416
4,710,474
4,710,484
4,710,533
4,710,574
4,710,582
4,710,615
4,710,641
4,710,685
4,710,706
4,710,743
4,710,871
4,710,305
4,710,946
4,709,496
4,709,498
4,709,500
4,709,805
4,710,304
4,710,647
4,710,942
4,709,436
4,709,495
4,709,522
4,709,524
4,709,607
4,709,625
4,709,631
4,709,632
4,709,633
4,709,702
4,709,715
4,709,716
4,709,733
4,709,740
4,709,747
4,709,748
4,709,756
4,709,757
4,709,785
4,709,861
4,709,888
4,709,901
4,709,903
4,709,907
4,709,914
4,709,927
4,709,953

44 : 4,709,765
45 : 4,709,452
46 : 4,709,456
47 : 4,709,526
48 : 4,709,462

4,709,956
4,709,973
4,710,071
4,710,080
4,710,128
4,710,134
4,710,252
4,710,262
4,710,340
4,710,368
4,710,377
4,710,393
4,710,399
4,710,417
4,710,437
4,710,504
4,710,580
4,710,589
4,710,591
4,710,606
4,710,662
4,710,665
4,710,739
4,710,758
4,710,778
4,710,819
4,710,843
4,710,880
4,710,955
4,710,969
4,710,030
4,710,174
4,709,532
4,709,536
4,709,561
4,709,579
4,709,909
4,710,719
4,709,456
4,709,573
4,709,828
4,709,890
4,709,468
4,709,481
4,709,486
4,709,505
4,709,525
4,709,589
4,709,598
4,709,604
4,709,610
4,709,624
4,709,693
4,709,712
4,709,725
4,709,726
4,709,729
4,709,761
4,709,762
4,709,810
4,709,833
4,709,880
4,709,933
4,709,946
4,710,058
4,710,059
4,710,061
4,710,082
4,710,142
4,710,162
4,710,166
4,710,180
4,710,207
4,710,214
4,710,226
4,710,260

49 : 4,709,718
50 : 4,710,110
51 : 4,709,427
56 : 4,709,657

4,710,303
4,710,326
4,710,327
4,710,328
4,710,362
4,710,407
4,710,429
4,710,482
4,710,540
4,710,563
4,710,586
4,710,593
4,710,644
4,710,711
4,710,712
4,710,715
4,710,732
4,710,763
4,710,799
4,710,866
4,710,886
4,710,902
4,710,906
4,710,917
4,710,931
4,710,933
4,710,943
4,710,948
4,710,949
4,709,718
4,710,232
4,710,293
4,710,616
4,710,110
4,709,427
4,709,430
4,709,653
4,709,717
4,709,837
4,709,913
4,710,131
4,710,181
4,710,478
4,710,522
4,710,550
4,710,710
4,710,941
4,709,647
4,709,952
4,710,169
4,710,271
4,710,343
4,710,775
4,709,661
4,710,064
4,710,296
4,710,587
4,709,449
4,709,458
4,709,474
4,709,479
4,709,518
4,709,895
4,709,961
4,709,963
4,710,055
4,710,107
4,710,187
4,710,280
4,710,334
4,710,381
4,710,445
4,710,468
4,710,476
4,710,692
4,710,717
4,710,740
4,710,777
4,709,657
4,709,916

DESIGN PATENTS

04	292,940	09	293,026		292,978	34	292,947		292,968		293,038
05	293,028		293,029		293,003		292,962		292,974	44	292,952
06	292,950	10	293,013		293,014		293,008		292,997		293,031
	292,967	12	293,011	18	292,992		293,024	41	292,941	50	292,964
	292,969		293,023	19	293,035	36	292,966		292,942	51	292,953
	292,973	13	292,954	20	293,015		292,991		292,943		293,005
	292,979		292,955	24	293,027		293,000		292,944		293,036
	292,987		292,993	25	292,988		293,017		292,945	53	292,958
	292,995		293,006		292,989		293,030		292,946	55	292,986
	293,012		293,025	31	293,016		293,034	42	292,963		293,018
08	292,996	17	292,961	32	293,037	39	292,948		293,007		

PLANT PATENTS

06	6,050	6,051	6,052		

STATUTORY INVENTION REGISTRATIONS

01	H393		H389	12	H391	29	H394	36	H377	48	H387
	H395		H390	24	H376	34	H381		H383		
06	H384	10	H386		H392		H382	42	H379		H388

U.S. GOVERNMENT PRINTING OFFICE : O—1987

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
C. William Verity, *Secretary*
PATENT AND TRADEMARK OFFICE
Donald J. Quigg, *Commissioner*